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Федеральное государственное автономное образовательное учреждение  
высшего профессионального образования  
«Казанский (Приволжский) федеральный университет»

УТВЕРЖДАЮ

Проректор по научной деятельности КФУ

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" 12 " 2014 г.



**Рабочая программа  
по английскому языку для аспирантов**

Б1.Б.2 Иностранный (английский) язык

Направление подготовки: 09.06.01 Информатика и вычислительная техника

Направленность (профиль) подготовки: 05.13.18 - Математическое моделирование, численные методы и комплексы программ

Квалификация выпускника «Исследователь. Преподаватель-исследователь»

Форма обучения : очная

Язык обучения: русский

Казань 2014 г.

## **1. КРАТКАЯ АННОТАЦИЯ**

### **Цели освоения дисциплины**

Объект изучения дисциплины – английский язык. Предмет изучения – общеделовое и общепрофессиональное общение на иностранном языке.

Целями освоения дисциплины «Иностранный язык» являются:

- достижение уровня владения иностранным языком, позволяющего продолжить обучение и вести профессиональную деятельность в иноязычной среде;
- обучения способом применения и дальнейшее развитие полученных в высшей школе знаний, навыков и умений по иностранному языку в различных видах речевой коммуникации;
- формирование знаний и навыков свободного чтения оригинальной литературы на иностранном языке в соответствующей отрасли знаний;
- формирование навыков оформлять извлеченную из иноязычных источников информацию в виде перевода или резюме;
- формирование навыков делать сообщения, доклады и презентации на иностранном языке на темы, связанные с научной работой аспиранта (экстерна);
- формирование навыков ведения беседы по специальности на иностранном языке.

### **2. МЕСТО ДИСЦИПЛИНЫ В СТРУКТУРЕ ОПОП**

Дисциплина «Иностранный язык» относится к базовой части учебного плана подготовки аспирантов по направлениям подготовки: 01.00.00; 01.06.01; 02.00.00; 02.06.01; 03.00.00; 03.06.01; 04.00.00; 04.06.01; 05.00.00; 05.06.01; 06.00.00; 06.06.01; 09.00.00; 09.06.01; 11.00.00; 11.06.01; 37.00.00; 37.06.01; 38.00.00; 38.06.01; 39.00.00; 39.06.01; 40.00.00; 40.06.01; 41.00.00; 41.06.01; 42.00.00; 42.06.01; 44.00.00; 44.06.01; 45.00.00; 45.06.01; 46.00.00; 46.06.01; 47.00.00; 47.06.01.

Осваивается на 1 курсе обучения (1 и 2 семестр).

Для успешного освоения дисциплины «Иностранный язык» аспирант должен освоить материал предшествующих дисциплин:

- а) иностранный язык;
- б) деловой иностранный язык;
- в) практика делового общения;
- г) иностранный язык: технический перевод;
- д) иностранный язык в профессиональной коммуникации.

Знания, полученные при изучении дисциплины «Иностранный язык для аспирантов» могут быть использованы при выполнении научно-исследовательской работы, а также при сдаче кандидатского экзамена по иностранному языку.

### **3. ПЕРЕЧЕНЬ ПЛАНИРУЕМЫХ РЕЗУЛЬТАТОВ ОБУЧЕНИЯ ПО ДИСЦИПЛИНЕ:**

В результате освоения дисциплины обучающийся должен:

1) знать:

- а) основные лексико-грамматические конструкции, специфичные для научного и официально-делового стилей;
- б) социокультурные, профессионально-ориентированные модели поведения в сфере научного общения;
- с) основы извлечения и интерпретация информации научного характера на основе просмотрового и поискового видов чтения.

2) уметь:

- а) понимать на слух оригинальную монологическую и диалогическую речь по специальности, опираясь на изученный языковой материал, фоновые

страноведческие и профессиональные знания, навыки языковой и контекстуальной догадки;

- б) уметь делать резюме, сообщения, доклад на иностранном языке;
- в) уметь читать, понимать и использовать в своей научной работе оригинальную научную литературу по специальности, опираясь на изученный языковой материал, фоновые страноведческие и профессиональные знания и навыки языковой и контекстуальной догадки;
- г) уметь составить план (конспект) прочитанного, изложить содержание прочитанного в форме резюме; написать сообщение или доклад по темам проводимого исследования.

3) владеть:

- а) подготовленной, а также неподготовленной монологической речью, диалогической речью в ситуациях научного, профессионального и бытового общения в пределах изученного языкового материала и в соответствии с избранной специальностью;
- б) всеми видами чтения (изучающее, ознакомительное, поисковое и просмотровое);
- с) навыками письма в пределах изученного языкового материала.

В результате освоения дисциплины формируются следующие компетенции:

Шифр компетенции	Расшифровка приобретаемой компетенции
УК-4	– готовность использовать современные методы и технологии научной коммуникации на государственном и иностранном языках.

#### 4. СТРУКТУРА И СОДЕРЖАНИЕ ДИСЦИПЛИНЫ «ИНОСТРАННЫЙ (АНГЛИЙСКИЙ) ЯЗЫК ДЛЯ АСПИРАНТОВ»

##### 4.1. Распределение трудоёмкости дисциплины (в часах) по видам нагрузки обучающегося и по разделам дисциплины

Общая трудоемкость дисциплины составляет 5 зачетных единиц, 180 часов (72 часа - аудиторная работа, 72 часов – самостоятельная работа, 36 часов - подготовка к экзамену).

Форма промежуточной аттестации по дисциплине:

экзамен – во 2 семестре.

N	Раздел Дисциплины/ Модуля	Семестр	Лекции	Практические занятия	Лабораторные работы	Самостоятельная работа
1.	Тема 1. Фонетика	1-2	0	3	0	3
2	Тема 2. Грамматика	1-2	0	10	0	10

№	Раздел Дисциплины/ Модуля	Семестр	Лекции	Практические занятия	Лабораторные работы	Самостоятельная работа
3	Тема 3. Лексика	1-2	0	6	0	6
4.	Тема 4. Аудирование	1-2	0	5	0	5
5.	Тема 5. Говорение	1-2	0	8	0	8
6.	Тема 6. Чтение	1-2	0	12	0	24
7.	Тема 7. Письмо	1-2	0	14	0	26
8.	Тема 8. Чтение и перевод	1-2	0	14	0	26
9.	Итоговая форма контроля	2				Кандидатский экзамен
	Итого		0	72	0	108

## 4.2 Содержание дисциплины

### Тема 1: Фонетика

Интонационное оформление предложения: словесное, фразовое и логическое ударения, мелодия, паузация; фонологические противопоставления, релевантные для изучаемого языка; фонетическая эмфаза и т.д.

### Тема 2: Грамматика

Сложное предложение: сложносочиненное и сложноподчиненное предложения. Союзы и относительные местоимения. Эллиптические предложения. Бессоюзные придаточные. Употребление личных форм глагола в активном и пассивном залогах.

Функции инфинитива: инфинитив в функции подлежащего, определения, обстоятельства. Синтаксические конструкции: оборот «дополнение с инфинитивом» (объектный падеж с инфинитивом); оборот «подлежащее с инфинитивом» (именительный падеж с инфинитивом); инфинитив в функции вводного члена; инфинитив в составном именном сказуемом (be + инф.) и в составном модальном сказуемом; (оборот «for + smb. to do smth.»). Сослагательное наклонение. Модальные глаголы. Модальные глаголы с простым и перфектным инфинитивом. Атрибутивные комплексы (цепочки существительных). Эмфатические (в том числе инверсионные) конструкции в форме Continuous или пассива; инвертированное придаточное уступительное или причины; двойное отрицание. Местоимения, слова-заместители (that (of), those (of), this, these, do, one, ones), сложные и парные союзы, сравнительно-сопоставительные обороты (as ... as, not so ... as, the ... the).

### Тема 3: Лексика

Терминологические особенности языка специальности. Словообразование.

### Тема 4: Аудирование

Аспирант (экстерн) должен уметь понимать на слух оригинальную монологическую и диалогическую речь по специальности, опираясь на изученный языковой материал, фоновые страноведческие и профессиональные знания, навыки языковой и контекстуальной догадки.

### Тема 5: Говорение

Умения аудирования и говорения должны развиваться во взаимодействии с умением чтения. Основное внимание следует уделять коммуникативной адекватности высказываний монологической и диалогической речи (в виде пояснений, определений, аргументации, выводов, оценки явлений, возражений, сравнений, противопоставлений, вопросов, просьб и т.д.).

К концу курса аспирант (экстерн) должен владеть:

- умениями монологической речи на уровне самостоятельно подготовленного и неподготовленного высказывания по темам специальности и по диссертационной работе (в форме сообщения, информации, доклада);
- умениями диалогической речи, позволяющими ему принимать участие в обсуждении вопросов, связанных с его научной работой и специальностью.

На кандидатском экзамене аспирант (экстерн) должен продемонстрировать владение подготовленной монологической речью, а также неподготовленной монологической и диалогической речью в ситуации официального общения в пределах программных требований. Оценивается содержательность, адекватная реализация коммуникативного намерения, логичность, связность, смысловая и структурная завершенность, нормативность высказывания. При развитии навыков устной речи особое внимание уделяется порядку слов как в аспекте коммуникативных типов предложений, так и внутри повествовательного предложения; употреблению строевых грамматических элементов (местоимений, вспомогательных глаголов, наречий, предлогов, союзов); глагольным формам, типичным для устной речи; степеням сравнения прилагательных и наречий; средствам выражения модальности.

#### Тема 6: Чтение

Для чтения используются оригинальная/ аутентичная монографическая и периодическая литература по специальности аспиранта (экстерн).

Аспирант (экстерн) должен продемонстрировать умение читать оригинальную литературу по специальности, опираясь на изученный языковой материал, фоновые страноведческие и профессиональные знания, навыки языковой и контекстуальной догадки. Оцениваются навыки изучающего, а также поискового и просмотрового чтения.

В первом случае оценивается умение максимально точно и адекватно извлекать основную информацию, содержащуюся в тексте, проводить обобщение и анализ основных положений предъявленного научного текста для последующего перевода на язык обучения, а также составления письменного резюме на иностранном языке.

Письменный перевод научного текста по специальности оценивается с учетом общей адекватности перевода, то есть отсутствия смысловых искажений, соответствия норме и узусу языка перевода, включая употребление терминов.

Резюме прочитанного текста оценивается с учетом объема и правильности извлеченной информации, адекватности реализации коммуникативного намерения, содержательности, логичности, смысловой и структурной завершенности, нормативности текста. При поисковом и просмотровом чтении оценивается умение в течение короткого времени определить круг рассматриваемых в тексте вопросов и выявить основные положения автора (summary). Оценивается объем и правильность извлеченной информации. В качестве учебных текстов и литературы для чтения используется оригинальная монографическая и периодическая литература по тематике широкого профиля вуза (научного учреждения), по узкой специальности аспиранта (экстерн), а также статьи из журналов, издаваемых за рубежом.

#### Тема 7: Письмо

Аспирант (экстерн) должен владеть умениями письма в пределах изученного языкового материала, в частности уметь составить план (конспект) прочитанного, изложить содержание прочитанного в форме письменного резюме; написать сообщение, презентацию или доклад по теме проводимого исследования.

#### Тема 8: Чтение и перевод

Устный и письменный перевод с иностранного языка на родной язык используется как средство овладения иностранным языком, как прием развития умений и навыков чтения, как наиболее эффективный способ контроля полноты и точности понимания. Для формирования некоторых базовых умений перевода необходимы сведения об особенностях научного функционального стиля, а также по теории перевода: понятие перевода; эквивалент и аналог; переводческие трансформации; компенсация потерь при переводе; контекстуальные замены; многозначность слов; словарное и контекстное значение слова; совпадение и расхождение значений интернациональных слов («ложные друзья» переводчика) и т.п.

## **5. ОБРАЗОВАТЕЛЬНЫЕ ТЕХНОЛОГИИ**

Освоение дисциплины "Иностранный язык" предполагает использование как традиционных (практические занятия с использованием методических материалов), так и инновационных образовательных технологий с использованием в учебном процессе активных и интерактивных форм проведения занятий: выполнение ряда практических заданий с использованием профессиональных программных средств создания и ведения электронных баз данных; мультимедийных программ, включающих подготовку и выступления аспирантов на семинарских занятиях с фото-, аудио- и видеоматериалами по предложенной тематике. ЭОРы на платформе Moodle, лингафонные кабинеты SANAKO.

## **6. УЧЕБНО-МЕТОДИЧЕСКОЕ ОБЕСПЕЧЕНИЕ ДЛЯ САМОСТОЯТЕЛЬНОЙ РАБОТЫ ОБУЧАЮЩИХСЯ ПО ДИСЦИПЛИНЕ.**

### **Тема 1. Фонетика**

❖ домашнее задание

Изучить фонетический материал соответствующего урока учебника Турук И.Ф., Петухова М.В., Чеботарев Ю.С., Гулая Т.М. A COURSE OF BASIC ENGLISH REVISION. Курс повторения основ английского языка: учебно-методический комплекс (см. список литературы) и подготовиться к устному опросу.

### **Тема 2. Грамматика**

❖ домашнее задание

Изучить грамматический материал соответствующего раздела учебника Добронецкая Э.Г. Грамматические трудности английского языка (см. список литературы) и подготовиться к письменной работе.

### **Тема 3. Лексика**

❖ домашнее задание

Выбрать из текста на перевод 15 базовых терминов, найти к ним определения на английском языке и эквиваленты на русском языке и подготовиться к устному/письменному опросу.

### **Тема 4. Аудирование**

❖ домашнее задание

Прослушать отрывок на английском языке по выбору преподавателя и ответить на вопросы.

### **Тема 5. Говорение**

❖ домашнее задание, примерные задания:

Подготовить рассказ на английском языке по теме исследования с обоснованием ее актуальности и новизны.

### **Тема 6. Чтение**

❖ домашнее задание

Просмотровое чтение отрывка спецтекста на английском языке по выбору преподавателя с последующим ответом на поставленные вопросы.

### **Тема 7. Письмо**

❖ домашнее задание

Подготовить письменное резюме на английском языке отрывка текста по специальности (2500 п.знаков).

### **Тема 8. Чтение и перевод**

❖ домашнее задание

Прочитать и письменно перевести отрывок текста по специальности (2000 п.знаков).

Общий объем литературы за полный курс по всем видам работ, учитывая временные критерии при различных целях, должен составлять примерно 600000-750000 печ. знаков (то есть 240-300 стр.). Распределение учебного материала для аудиторной и внеаудиторной проработки осуществляется в соответствии с принятым учебным графиком.

## **7. ФОНД ОЦЕНОЧНЫХ СРЕДСТВ**

### **7.1. Регламент дисциплины**

Итоговая форма контроля – кандидатский экзамен – 2 семестр.

### **СОДЕРЖАНИЕ КАНДИДАТСКОГО ЭКЗАМЕНА ПО АНГЛИЙСКОМУ ЯЗЫКУ**

На кандидатском экзамене аспирант (экстерн) должен продемонстрировать умение пользоваться иностранным языком как средством профессионального общения в научной сфере.

Аспирант (экстерн) должен владеть орфографической, орфоэпической, лексической и грамматической нормами изучаемого языка и правильно использовать их во всех видах речевой коммуникации, в научной сфере в форме устного и письменного общения.

На кандидатском экзамене аспирант (экстерн) должен продемонстрировать владение подготовленной монологической речью, а также неподготовленной монологической и диалогической речью в ситуации официального общения в пределах программных требований.

Оценивается содержательность, адекватная реализация коммуникативного намерения, логичность, связность, смысловая и структурная завершенность, нормативность высказывания.

Аспирант (экстерн) должен продемонстрировать умение читать оригинальную/аутентичную литературу по специальности, опираясь на изученный языковой материал, фоновые страноведческие и профессиональные знания, навыки языковой и контекстуальной догадки.

Оцениваются навыки изучающего, а также поискового и просмотрового чтения. В первом случае оценивается умение максимально точно и адекватно извлекать основную информацию, содержащуюся в тексте, проводить обобщение и анализ основных положений предъявленного научного текста для последующего перевода на язык обучения, а также составления письменного резюме на иностранном языке. Письменный перевод научного текста по специальности оценивается с учетом общей адекватности перевода, то есть отсутствия смысловых искажений, соответствия норме и узусу языка перевода, включая употребление терминов.

Резюме прочитанного текста оценивается с учетом объема и правильности извлеченной информации, адекватности реализации коммуникативного намерения, корректности обобщений и анализа основных положений, содержательности, логичности, смысловой и структурной завершенности, нормативности текста.

При поисковом и просмотрном чтении оценивается умение в течение короткого времени определить круг рассматриваемых в тексте вопросов и выявить основные положения автора.

Оценивается объем и правильность извлеченной информации.

## СТРУКТУРА КАНДИДАТСКОГО ЭКЗАМЕНА

Кандидатский экзамен по английскому языку проводится в два этапа. На первом этапе аспирант (экстерн) выполняет:

1) устный перевод на русский язык, резюмирование и краткое изложение основного содержания оригинальных/ аутентичных научных текстов по специальности на английском языке, прочитанных и проанализированных аспирантом (экстерном) в ходе подготовки к экзамену. Общий объем текстов 600 000 - 700 000 печатных знаков.

2) письменный перевод на русский язык оригинального/ аутентичного научного текста по специальности на русский язык. Объем текста 15000 печатных знаков.

Проанализированная литература и письменный перевод предъявляются комиссии в день экзамена.

Качество выполнения заданий оценивается по зачетной системе и является условием допуска ко второму этапу экзамена.

Второй этап экзамена включает в себя три задания:

- изучающее чтение незнакомого оригинального/ аутентичного текста по специальности. Объем текста 2500-3000 печатных знаков. Время выполнения 45-60 минут. Форма проверки: письменное резюме на английском языке с последующей устной презентацией;

- беглое (просмотровое) чтение оригинального текста по специальности. Объем текста 1500-2000 печатных знаков. Время выполнения 2-3 минуты. Форма проверки: передача извлеченной информации на английском языке (устно);

- беседа с экзаменаторами на английском языке по вопросам, связанным со специальностью и содержанием научного исследования аспиранта (экстерна), его теме, актуальности, целям и задачам, объекту и предмету, рабочей гипотезе, новизне, теоретической, практической значимости и апробации.

Результаты экзамена оцениваются по пятибалльной системе.

Образцы экзаменационных текстов см. в Приложении 1.

## 7.2 Оценочные средства текущего контроля

### I текущий контроль

#### Тема 1. Фонетика

❖ Устный опрос, примерные вопросы:

Прочитать вслух отрывок оригинального текста на английском языке, обращая внимание на его фонетические особенности.

#### Тема 2. Грамматика

❖ Письменная работа, пример задания:

Составить письменное резюме по отрывку оригинального текста (2500 знаков), обращая внимание на грамматические структуры академического английского языка.

❖ Устный опрос, примерные задания:

Подготовить краткое изложение на английском языке содержание оригинального текста по специальности (1500 знаков), обращая внимание на грамматические структуры академического английского языка.



### **Тема 3. Лексика**

- ❖ устный опрос

примерные вопросы: устный перевод терминов с русского языка на английский и обратно.

- ❖ письменная работа, примерные задания:

Составить письменное резюме по отрывку оригинального текста (2500 знаков), обращая внимание на терминологические особенности (соответственно специальности).

### **Тема 4. Аудирование**

- ❖ Прослушать отрывок на английском языке и ответить на вопросы.
- ❖ Прослушать отрывок на английском языке с последующим пересказом основного содержания на английском языке.

### **Тема 5. Говорение**

- ❖ устный опрос

Представить рассказ на английском языке по теме исследования с обоснованием ее актуальности и новизны.

### **Тема 6. Чтение**

- ❖ Просмотровое чтение отрывка спецтекста на английском языке с последующим ответом на поставленные вопросы.

- ❖ устный опрос

Прочитать и подготовить summary спецтекста на английском языке (1500 п.знаков) в аудитории. Время выполнения 5 минут.

### **Тема 7. Письмо**

- ❖ Подготовить устное резюме на английском языке отрывка текста по специальности (2500 п.знаков) в аудитории.

- ❖ письменная работа

Подготовить письменное резюме на английском языке отрывка текста по специальности (2500 п.знаков) в аудитории. Время выполнения 60 минут.

### **Тема 8. Чтение и перевод**

- ❖ письменная работа

Прочитать и письменно перевести отрывок текста по специальности (2000 п.знаков) в аудитории. Время выполнения 60 минут.

- ❖ устный опрос

Устный перевод отрывка текста по специальности (1500 п.знаков) в аудитории. Время выполнения 30 минут

## **II**

### **Промежуточный контроль**

#### **Примерные задания для устного опроса:**

1. Find the differences between academic and non-academic text.
2. Analyze the paragraph and find its main parts - topic sentence, body sentence, final sentence.
3. Find different ways of connecting parts of an abstract.
4. What is the main purpose of a summary?
5. What type of essay is the example given?
6. Was the statistical information described correctly?
7. Find mistakes in the cited piece of writing.

8. Find the mistakes in the given grant proposal.
9. Name the main features of a research report.

**Образцы письменных заданий:**

**TASK 1**

1. Assess the academic features of the piece of writing.
2. Organize a paragraph according to the principles of academic writing.
3. Read the article and write an abstract for it.
4. Read the article and write a summary for it.
5. Write the plan of an essay for a given topic.
6. Use the following tables/ graphs and write the description of the information given.
7. Write different ways of quoting the material of a given author.
8. Generalize the following information for a research report.

**TASK 2.**

Make full sentences by matching the correct halves.

i	Before we come to the end	there are four major features.
l	I'd be glad to answer	we start the discussion now.
k	To summarize	by quoting a well-known saying.
m	We can conclude	we should reduce our costs.
n	In my opinion	any questions now.
j	<i>I'd like to suggest</i>	I'd like to thank you for your participation.

### TASK 3.

The sentences a-e below are the end of a presentation, but they are in the wrong order. Put them into the right order.

a	So, I'd now be glad to answer any questions.
b	I sincerely hope you'll all go away with a more complete picture of the principal activities of UNEXCO.
c	Very briefly, there are three. Firstly, fund-raising; secondly, publicity; and thirdly, political lobbying.
d	So, that brings me to the end of this presentation.
e	Finally, I'd like to leave you with something which I heard recently. 'You can't please all the people all the time, but we should certainly be able to feed all the people all the time.'

### TASK 4.

Change the language in this text to communicate the message more persuasively.

The trouble with business today is that people don't have time. Companies have reduced their workforces so that fewer people have to do the same amount of work. This means that managers don't see what is happening around them. They need their time to work through their regular tasks and have no time to take on new initiatives.

Time for reflection is important. Decisions taken now not only affect today's business, they can also have an influence on business in the long term. Strategy is the concern of senior management when it needs to be the concern of everybody in the company.

### TASK 5 .

Match the more formal verbs with their less formal (spoken) equivalents.

	<i>formal</i>		<i>informal</i>
1	<i>to acquire</i>	a	<i>to put into action</i>
2	<i>to reduce</i>	b	<i>to pull out</i>
3	<i>to access</i>	c	<i>to get worse</i>
4	<i>to appreciate</i>	d	<i>to buy</i>
5	<i>to capture</i>	e	<i>to pay</i>
6	<i>to deteriorate</i>	f	<i>to cut down</i>
7	<i>to implement</i>	g	<i>to get into</i>
8	<i>to rationalize</i>	h	<i>to take</i>

9            to  
              remunerate  
10          to  
              withdraw

i    to understand  
j    to make simpler

### **TASK 6.**

Add an adverb to these sentences to emphasize the message.

- |   |   |                |
|---|---|----------------|
| a | This has been a good year. **                         |                |
| b | We have had a difficult time.*                        |                |
| c | We have seen a disastrous decline in our profits. *** | <b>Key</b>     |
| d | It was easy to achieve our objectives. *              | moderate *     |
| e | The announcement was unexpected. ***                  | very strong ** |
| f | I've got some bad news. **                            | total ***      |

### **III**

#### **Пример итоговой письменной контрольной работы:**

Analyze the following sentences and translate them:

1. To be sure, these subjects are not beyond the reach of medical students who are mostly highly qualified.
2. Care is to be taken not to use methods to be mentioned later.
3. The regions concerned proved to be parts of our country.
4. The few accounts about to be presented are by no means a complete history of our science.
5. Nowhere in the sea does life exist in such bewildering abundance as in the surface waters.
6. Coming, as it did, so early in the history of kinetic theory, this experimental result was of great importance.
7. He was asked to give up the idea, but he wouldn't listen.
8. There are several more questions to be answered in this connection.
9. Should water be added to these substances, the X-ray periods will be enlarged.
10. There being many more biogenetic hypotheses, the reader is referred to the following references.
11. Some 2 billion people speak languages that are rarely, if ever, taught in the USA.
12. Other conditions being equal, the acceleration remains constant.
13. While experimenting in his laboratory last year he would stay there for weeks.
14. However complicated this type of calculation should be, we are going to use it extensively.
15. Were this so, many water areas would freeze solid.

### **IV**

#### **Итоговый контроль (кандидатский экзамен)**

**Примеры текстов см. в Приложении 1:**

**7.3. Таблица соответствий компетенций, критериев оценки их освоения и оценочных средств**

Индекс компетенции	Расшифровка компетенции	Показатель формирования компетенции для данной дисциплины	Оценочное средство
УК-4	– готовность использовать современные методы и технологии научной коммуникации на государственном и иностранном языках.	Умение понимать и использовать в своей научной работе оригинальную научную литературу по специальности, опираясь на изученный языковой материал, фоновые страноведческие и профессиональные знания и навыки языковой и контекстуальной догадки; - умение делать резюме, сообщения, доклад на иностранном языке; - владение основами изложения и интерпретация информации научного характера на основе просмотрового и поискового видов чтения.	Письменный и устный перевод; Письменное и устное резюмирование, аннотирование, передача основного содержания, критический анализ научного содержания текстов на английском языке по специальности.

**8. МЕТОДИЧЕСКИЕ УКАЗАНИЯ ДЛЯ ОБУЧАЮЩИХСЯ ПРИ ОСВОЕНИИ ДИСЦИПЛИНЫ**

**Слова: как запоминать слова?**

- Попробовать прочитать, повторить за диктором, написать на карточку с соответствующими грамматическими формами.
  - Комбинировать: по родам, по смысловым группам.
  - Придумать историю.
1. сделайте карточки со словами, которые Вы хотите выучить. Всегда проговаривайте слова вслух! Какие слова трудны? Наклейте их, например, мебель, на соответствующие предметы.

2. напишите новое слово с артиклем на карточке, отметьте ударение. На обороте напишите перевод. По мере запоминания слова перемещайте карточки в Вашем словаре.
3. из журналов или интернета подберите картинки к словам, которые Вы хотели бы выучить или нарисуйте сами. На обороте напишите нужное Вам слово.
4. слова учите всегда с грамматическими формами: существительные – артикль=род и множественное число, глаголы – три основные временные формы и т.п.
5. метод пантомимы: жестами изобразите слова и понятия, которые надо запомнить.
6. метод группы: разбейте слова на смысловые группы, например, фрукты, приборы, напитки и т.д. В один прием запоминайте слова только одной группы, затем делайте перерыв.
7. метод историй: с новыми словами придумывайте маленькие истории, объединяя 7-9 новых слов в одной.

### **Чтение//Текст:**

Чтение поисковое

Чтение сообщим охватом содержания

Чтение на скорость

Читать по предложениям несколько раз.

Читать, закрывая половину строки

Чтение с ограничением времени.

1. чтение начинается с названия текста: какую информацию оно несет, что будет дальше?
2. сделайте текст интересным для себя
3. задания к тексту помогают понять его: предтекстовые снимают трудности, по тексту – заставляют быть внимательным.
4. Читайте дважды! При первом прочтении обращайтесь внимание на интернациональные слова, которые помогают читать, не спешите заглядывать в словарь, попробуйте догадаться о значении слова по контексту. Непонятно? – тогда смело ищите слово в словаре.
5. перед пересказом прочтите еще раз: сделайте скелет текста, выбирая ключевые слова.
6. прочтите еще раз, если Вам трудно установить связи. Подчеркивайте все слова, которые Вы быстро «узнаете».
7. если Вы сделали все задания к тексту, тогда пересказ готов!

### **Аудирование//текст**

Общее понимание

1. ответьте мысленно на вопросы: кто, где, когда?
2. какие эмоции вызывает у Вас услышанное?

*Избирательное понимание*

1. Прослушивание может быть поэтапным: 2-3 разовое
2. при первом прослушивании ответьте на вышеупомянутые 2 вопроса.

3. при повторном прослушивании сначала прочтите задания и постарайтесь ответить на них, затем прослушайте текст, выполняя данные задания. В зависимости от количества заданий текст может быть повторно прослушан либо по частям, либо полностью.

#### *Полное понимание*

Для данного вида аудирования полезными будут все вышеизложенные указания. Дополнительно во время повторного прослушивания рекомендуется составить план и выписать по ходу звучания ключевые слова.

#### **Письмо**

Перед письменными работами рекомендуется просмотреть тот материал, по которому проводится данная работа.

При написании творческой работы, предварительно необходимо сформулировать тему и аргументирование, т.е. составить развернутый план, а затем приступить к ее написанию.

## 9. УЧЕБНО-МЕТОДИЧЕСКОЕ И ИНФОРМАЦИОННОЕ ОБЕСПЕЧЕНИЕ ДИСЦИПЛИНЫ

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### 9.3 Интернет-ресурсы

#### Электронные источники информации:

- [www.nature.com](http://www.nature.com)
- [www.economist.com](http://www.economist.com)
- [www.newsweek.com](http://www.newsweek.com)
- [www.science.com](http://www.science.com)

#### Зарубежные сетевые ресурсы (доступные в библиотечных ресурсах КФУ)

- [American Chemical Society \(ACS\)](http://pubs.acs.org/) – журналы по химии и смежным отраслям. - <http://pubs.acs.org/>
- [American Institute of Physics \(AIP\)](http://scitation.aip.org/) – журналы по физике и смежным отраслям. - <http://scitation.aip.org/>
- [American Physical Society \(APS\)](http://journals.aps.org/) – журналы по физике и смежным отраслям. - <http://journals.aps.org/>
- [Beilstein Journal of Organic Chemistry](http://www.beilstein-journals.org/bjoc/home/home.htm) – журнал по органической химии. - <http://www.beilstein-journals.org/bjoc/home/home.htm>
- [Beilstein Journal of Nanotechnology](http://www.beilstein-journals.org/bjnano/home/home.htm) - международный рецензируемый журнал по проблемам нанотехнологий. - <http://www.beilstein-journals.org/bjnano/home/home.htm>
- [Cambridge University Press](http://journals.cambridge.org/action/login) – журналы издательства Кембриджского университета по всем отраслям знания. - <http://journals.cambridge.org/action/login>
- [Directory of Open Access Journals \(DOAJ\)](http://doaj.org/) - журналы открытого доступа. - <http://doaj.org/>
- [Elsevier \(Science Direct\)](http://www.sciencedirect.com/) –коллекции журналов издательства «Elsevier» по всем отраслям знаний. - <http://www.sciencedirect.com/>
- [Elsevier Open Access Journals](http://www.elsevier.com/about/open-access/open-access-journals) - журналы открытого доступа (Open access) издательства Elsevier - <http://www.elsevier.com/about/open-access/open-access-journals>
- [GeoScienceWorld](http://www.geoscienceworld.org/) – полнотекстовые журналы в сфере наук о Земле. Архив до 1940-х годов. - <http://www.geoscienceworld.org/>
- [Hindawi Publishing Open Access](http://www.hindawi.com/journals/) - журналы открытого доступа (Open access) издательства Hindawi - <http://www.hindawi.com/journals/>
- [Institute of Physics \(IOP\)](http://iopscience.iop.org/) – журналы по физике, астрономии, прикладной математике и др. - <http://iopscience.iop.org/>
- [Journal of the Physical Society of Japan \(JPSJ\)](http://journals.jps.jp/) – журнал по физике. - <http://journals.jps.jp/>
- [Nature Publishing Group \(NPG\)](http://kpfu.ru/nature-publishing-group-npg-7233.html) – журналы по проблемам биологии, медицины, биофизики, биохимии, материаловедения, нанотехнологий и др. - <http://kpfu.ru/nature-publishing-group-npg-7233.html>
- [Optical Society of America \(OSA\)](http://www.opticsinfobase.org/) – журналы Американского оптического общества. - <http://www.opticsinfobase.org/>
- [Oxford University Press](http://www.oxfordjournals.org/en/) – журналы издательства Оксфордского университета по всем отраслям знания. - <http://www.oxfordjournals.org/en/>
- [Royal Society of Chemistry](http://pubs.rsc.org/en/journals?key=title&value=current) – журналы по химии, биологии, охране окружающей среды, энергетике, технологии, образованию. - <http://pubs.rsc.org/en/journals?key=title&value=current>
- [Sage Journals Online](http://online.sagepub.com/) – журналы по всем отраслям знания. - <http://online.sagepub.com/>
- [Science](http://www.sciencemag.org/) – мультидисциплинарный научный журнал. - <http://www.sciencemag.org/>

- **Taylor&Francis** – более 1000 журналов по всем отраслям знания. - <http://www.tandfonline.com/>
- **The New England Journal of Medicine** – медицинский рецензируемый научный журнал. - <http://www.nejm.org/>
- **Thieme** – журналы по проблемам фармакологии, органической химии, органического синтеза. - <https://www.thieme-connect.com/products/all/home.html>
- **Wiley-Blackwell** – более 1500 журналов по всем областям знания. - <http://onlinelibrary.wiley.com/>
- **Журналы** открытого доступа по истории, математике, физике и другим дисциплинам. – <http://old.kpfu.ru/lib/index1.php?id=9&idm=0&num=49>

#### *Словари, работающие в режиме on-line*

- [www.multitran.ru](http://www.multitran.ru)
- [www.multilex.ru](http://www.multilex.ru)
- [www.lingvo.ru](http://www.lingvo.ru)
- [www.primavista.ru/dictionary/index.htm](http://www.primavista.ru/dictionary/index.htm)
- [www.yourdictionary.com](http://www.yourdictionary.com)
- <http://en.wiktionary.org>
- [www.translate.ru](http://www.translate.ru)

#### *Энциклопедии, работающие в режиме on-line*

- <http://en.wikipedia.org>
- <http://www.britannica.com>

#### *Обучающие иностранному языку ресурсы сети Интернет*

- <http://www.englishspace.com/>
- <http://alemeln.narod.ru>
- <http://www.english4u.dp.ua/>
- <http://www.toefl.ru>
- <http://www.native-english.ru/> (<http://enative.narod.ru/>)
- <http://www.better-english.com/exerciselist.html>

## **10. МАТЕРИАЛЬНО-ТЕХНИЧЕСКОЕ И ПРОГРАММНОЕ ОБЕСПЕЧЕНИЕ ДИСЦИПЛИНЫ**

Освоение дисциплины "Иностранный язык" предполагает использование следующего материально-технического обеспечения:

Мультимедийная аудитория, вместимостью более 60 человек. Мультимедийная аудитория состоит из интегрированных инженерных систем с единой системой управления, оснащенная современными средствами воспроизведения и визуализации любой видео и аудио информации, получения и передачи электронных документов. Типовая комплектация мультимедийной аудитории состоит из: мультимедийного проектора, автоматизированного проекционного экрана, акустической системы, а также

интерактивной трибуны преподавателя, включающей тач-скрин монитор с диагональю не менее 22 дюймов, персональный компьютер (с техническими характеристиками не ниже Intel Core i3-2100, DDR3 4096Mb, 500Gb), конференц-микрофон, беспроводной микрофон, блок управления оборудованием, интерфейсы подключения: USB, audio, HDMI. Интерактивная трибуна преподавателя является ключевым элементом управления, объединяющим все устройства в единую систему, и служит полноценным рабочим местом преподавателя. Преподаватель имеет возможность легко управлять всей системой, не отходя от трибуны, что позволяет проводить лекции, практические занятия, презентации, вебинары, конференции и другие виды аудиторной нагрузки обучающихся в удобной и доступной для них форме с применением современных интерактивных средств обучения, в том числе с использованием в процессе обучения всех корпоративных ресурсов. Мультимедийная аудитория также оснащена широкополосным доступом в сеть интернет. Компьютерное оборудование имеет соответствующее лицензионное программное обеспечение.

Компьютерный класс, представляющий собой рабочее место преподавателя и не менее 15 рабочих мест студентов, включающих компьютерный стол, стул, персональный компьютер, лицензионное программное обеспечение. Каждый компьютер имеет широкополосный доступ в сеть Интернет. Все компьютеры подключены к корпоративной компьютерной сети КФУ и находятся в едином домене.

Лингафонный кабинет, представляющий собой универсальный лингафонно-программный комплекс на базе компьютерного класса, состоящий из рабочего места преподавателя (стол, стул, монитор, персональный компьютер с программным обеспечением SANAKO Study Tutor, головная гарнитура), и не менее 12 рабочих мест студентов (специальный стол, стул, монитор, персональный компьютер с программным обеспечением SANAKO Study Student, головная гарнитура), сетевого коммутатора для структурированной кабельной системы кабинета.

Лингафонный кабинет представляет собой комплекс мультимедийного оборудования и программного обеспечения для обучения иностранным языкам, включающий программное обеспечение управления классом и SANAKO Study 1200, которые дают возможность использования в учебном процессе интерактивные технологии обучения с использованием современных мультимедийных средств, ресурсов Интернета.

Программный комплекс SANAKO Study 1200 дает возможность инновационного ведения учебного процесса, он предлагает широкий спектр видов деятельности (заданий), поддерживающих как практики слушания, так и тренинги речевой активности: практика чтения, прослушивание, следование образцу, обсуждение, круглый стол, использование Интернета, самообучение, тестирование. Преподаватель является центральной фигурой

процесса обучения. Ему предоставляются инструменты управления классом. Он также может использовать многочисленные методы оценки достижений учащихся и следить за их динамикой. SANAKO Study 1200 предоставляет учащимся наилучшие возможности для выполнения речевых упражнений и заданий, основанных на текстах, аудио- и видеоматериалах. Вся аудитория может быть разделена на подгруппы. Это позволяет организовать отдельную траекторию обучения для каждой подгруппы. Учащиеся могут работать самостоятельно, в автономном режиме, при этом преподаватель может контролировать их действия. В состав программного комплекса SANAKO Study 1200 также входит модуль Examination Module - модуль создания и управления тестами для проверки конкретных навыков и способностей учащегося. Гибкость данного модуля позволяет преподавателям легко варьировать типы вопросов в тесте и редактировать существующие тесты.

Также в состав программного комплекса SANAKO Study 1200 также входит модуль обратной связи, с помощью которых можно в процессе занятия провести экспресс-опрос аудитории без подготовки большого теста, а также узнать мнение аудитории по какой-либо теме.

Каждый компьютер лингафонного класса имеет широкополосный доступ к сети Интернет, лицензионное программное обеспечение. Все универсальные лингафонно-программные комплексы подключены к корпоративной компьютерной сети КФУ и находятся в едином домене.

Учебно-методическая литература для данной дисциплины имеется в наличии в электронно-библиотечной системе "БиблиоРоссика", доступ к которой предоставлен студентам. В ЭБС "БиблиоРоссика" представлены коллекции актуальной научной и учебной литературы по гуманитарным наукам, включающие в себя публикации ведущих российских издательств гуманитарной литературы, издания на английском языке ведущих американских и европейских издательств, а также редкие и малотиражные издания российских региональных вузов. ЭБС "БиблиоРоссика" обеспечивает широкий законный доступ к необходимым для образовательного процесса изданиям с использованием инновационных технологий и соответствует всем требованиям федеральных государственных образовательных стандартов высшего профессионального образования (ФГОС ВПО) нового поколения.

Учебно-методическая литература для данной дисциплины имеется в наличии в электронно-библиотечной системе "ZNANIUM.COM", доступ к которой предоставлен студентам. ЭБС "ZNANIUM.COM" содержит произведения крупнейших российских учёных, руководителей государственных органов, преподавателей ведущих вузов страны, высококвалифицированных специалистов в различных сферах бизнеса. Фонд библиотеки

сформирован с учетом всех изменений образовательных стандартов и включает учебники, учебные пособия, УМК, монографии, авторефераты, диссертации, энциклопедии, словари и справочники, законодательно-нормативные документы, специальные периодические издания и издания, выпускаемые издательствами вузов. В настоящее время ЭБС ZNANIUM.COM соответствует всем требованиям федеральных государственных образовательных стандартов высшего профессионального образования (ФГОС ВПО) нового поколения.

Учебно-методическая литература для данной дисциплины имеется в наличии в электронно-библиотечной системе Издательства "Лань", доступ к которой предоставлен студентам. ЭБС Издательства "Лань" включает в себя электронные версии книг издательства "Лань" и других ведущих издательств учебной литературы, а также электронные версии периодических изданий по естественным, техническим и гуманитарным наукам. ЭБС Издательства "Лань" обеспечивает доступ к научной, учебной литературе и научным периодическим изданиям по максимальному количеству профильных направлений с соблюдением всех авторских и смежных прав.

Учебно-методическая литература для данной дисциплины имеется в наличии в электронно-библиотечной системе "Консультант студента", доступ к которой предоставлен студентам. Электронная библиотечная система "Консультант студента" предоставляет полнотекстовый доступ к современной учебной литературе по основным дисциплинам, изучаемым в медицинских вузах (представлены издания как чисто медицинского профиля, так и по естественным, точным и общественным наукам). ЭБС предоставляет вузу наиболее полные комплекты необходимой литературы в соответствии с требованиями государственных образовательных стандартов с соблюдением авторских и смежных прав.

Программа составлена в соответствии с требованиями ФГОС ВО и учетом рекомендаций по направлению подготовки.

Автор программы:

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Программа одобрена на заседании Учебно-методической комиссии Института ВМ и ИТ КФУ от 11 сентября 2014 г. протокол № 1.

## Банк экзаменационных текстов

## МАТЕМАТИКА

## отрывок на резюме

## Motivation

Linear algebra problems appear throughout computational science and engineering, as well as the analysis of large data sets (Committee on the Analysis of Massive Data; Committee on Applied and Theoretical Statistics; Board on Mathematical Sciences and Their Applications; Division on Engineering and Physical Sciences; National Research Council 2013), so it is important to solve them as efficiently as possible. This includes solving systems of linear equations, least-squares problems, eigenvalue problems, the singular value decomposition, and their many variations that can depend on the structure of the input data.

When numerical algorithms were first developed (not just for linear algebra), efficiency was measured by counting arithmetic operations. Over time, as technological trends such as Moore's law kept making operations faster, the bottleneck in many algorithms shifted from arithmetic to communication, that is, moving data, either between levels of the memory hierarchy such as DRAM and cache, or between parallel processors connected over a network. Communication is necessary because arithmetic can only be performed on two operands in the same memory at the same time, and (in the case of a memory hierarchy) in the smallest, fastest memory at the top of the hierarchy ( e.g., cache). Indeed, a sequence of recent reports (Graham, Snir and Patterson 2004, Fuller and Millett 2011) has documented this trend. Today the cost of moving a word of data (measured in time or energy) can exceed the cost of an arithmetic operation by orders of magnitude, and this gap is growing exponentially over time.

Motivated by this trend, the numerical linear algebra community has been revisiting all the standard algorithms, direct and iterative, for dense and sparse matrices, and asking three questions: Are there lower bounds on the amount of communication required by these algorithms? Do existing algorithms attain the lower bounds? If not, are there new algorithms that do? The answers, which we will discuss in more detail in this paper, are briefly as follows. There are in fact communication lower bounds for most direct and iterative (i.e., Krylov subspace) algorithms. These lower bounds apply to dense and sparse matrices, and to sequential, parallel and more complicated computer architectures. Existing algorithms in widely used libraries often do asymptotically more communication than these lower bounds require, even for heavily studied operations such as dense matrix multiplication (matmul for short). In many cases there are new algorithms that do attain the lower bounds, and show large speed-ups in theory and practice (even for matmul). These new algorithms do not just require 'loop transformations' but sometimes have different numerical properties, different ways to represent the answers, and different data structures. Historically, the linear algebra community has been adapting to rising communication costs for a long time.

( From G. Ballard, E. Carson, J. Demmel, M. Hoemmen, N. Knight and O. Schwartz (2014). Communication lower bounds and optimal algorithms for numerical linear algebra . Acta Numerica, 23, pp 1-155 doi:10.1017/S0962492914000038)

## отрывок на перевод

### Modelling communication costs

More precisely, we will model the cost of communication as follows. There are two costs associated with communication. For example, when sending  $n$  words from one processor to another over a network, the words are first packed into a contiguous block of memory called a message, which is then sent to the destination processor. There is a fixed overhead time (called the latency cost or  $\alpha$ ) required for the packing and transmission over the network, and also time proportional to  $n$  needed to transmit the words (called the bandwidth cost or  $\beta n$ ). In other words, we model the time to send one message of size  $n$  by  $\alpha + \beta n$ , and the time to send  $S$  messages containing a total of  $W$  words by  $\alpha S + \beta W$ .

Letting  $\gamma$  be the time to perform one arithmetic operation, and  $F$  the total number of arithmetic operations, our overall performance model becomes  $\alpha S + \beta W + \gamma F$ . The same technological trends cited above tell us that  $\alpha\beta\gamma$ . This is why it is important to count messages  $S$  and words  $W$  separately, because either one may be the bottleneck. Later we will present lower bounds on both  $S$  and  $W$ , because it is of interest to have algorithms that minimize both bandwidth and latency costs.

On a sequential computer with a memory hierarchy, the model  $\alpha S + \beta W + \gamma F$  is enough to model two levels of memory, say DRAM and cache. When there are multiple levels of memory, there is a cost associated with moving data between each adjacent pair of levels, so there will be an  $\alpha S + \beta W$  term associated with each level.

On a parallel computer,  $\alpha S + \beta W + \gamma F$  will initially refer to the communication and arithmetic done by one processor only. A lower bound for one processor is (sometimes) enough for a lower bound on the overall algorithm, but to upper-bound the time required by an entire algorithm requires us to sum these terms along the critical path, that is, a sequence of processors that must execute in a linear order (because of data dependences), and that also maximizes the sum of the costs. Note that there may be different critical paths for latency costs, bandwidth costs and arithmetic costs.

We note that this simple model may be naturally extended to other kinds of architectures. First, when the architecture can overlap communication and computation (i.e., perform them in parallel), we see that  $\alpha S + \beta W + \gamma F$  may be replaced by  $\max(\alpha S + \beta W, \gamma F)$  or  $\max(\alpha S, \beta W, \gamma F)$ ; this can lower the cost by at most a factor of 2 or 3, and so does not affect our asymptotic analysis. Second, on a heterogeneous parallel computer, that is, with different processors with different values of  $\alpha$ ,  $\beta$ ,  $\gamma$ , memory sizes, etc., one can still use  $\alpha_i S_i + \beta_i W_i + \gamma_i F_i$  as the cost of processor  $i$ , and take the maximum over  $I$  or sum over critical paths to get lower and upper bounds.

( From G. Ballard, E. Carson, J. Demmel, M. Hoemmen, N. Knight and O. Schwartz (2014).  
Communication lower bounds and optimal algorithms for numerical linear algebra . Acta  
Numerica,  
23, pp 1-155 doi:10.1017/S0962492914000038)

## отрывок на пересказ

Our primary motivation for reorganizing Krylov basis computations (e.g.,  $Ax, \dots, Akx$ ) is to reduce their communication costs. Whereas general, tight lower bounds are open, we suggested that, in the absence of cancellation, any classical algorithm incurs computation and



communication costs at least as great as computing  $A \cdot X$  for some  $n \times k$  matrix  $X$ . And whereas we do not have general, tight communication lower bounds for SpMV either, it is reasonable to expect that when computing  $A \cdot X$  in parallel, the number of messages should be independent of  $k$ , and sequentially, the number of times  $A$  is read from slow memory should be independent of  $k$ , assuming  $k$  is not too large. We demonstrated that, for a family of stencil matrices and a range of parameters, sequential and parallel ‘tiled’ approaches (CA-Akx) satisfy these criteria, while conventional approaches (Akx) do not. In practice, we care about improved performance with respect to a physical measure such as time or energy. For example, if we model the time per  $n$ -word message as  $\alpha + \beta n$ , and the time per arithmetic operation as  $\gamma$ , then we can estimate the run time by  $\alpha S + \beta W + \gamma F$ , as explained in the Introduction; one can estimate energy cost in a similar manner. Extensive performance modelling for the approaches discussed here, as well as other approaches that reduce redundant computation, appeared in Demmel, Hoemmen, Mohiyuddin and Yelick (2008b); see also the preceding technical report by Demmel et al. (2007c). A shared-memory implementation subsequently appeared in Mohiyuddin et al. (2009) (see the thesis by Mohiyuddin 2012 for additional details), and demonstrated speed-ups for sparse matrices from a variety of domains (see Figure 7.1). We refer to those works for details about practical implementations of the Akx approaches given here.

( From G. Ballard, E. Carson, J. Demmel, M. Hoemmen, N. Knight and O. Schwartz (2014). Communication lower bounds and optimal algorithms for numerical linear algebra . Acta Numerica, 23, pp 1-155 doi:10.1017/S0962492914000038)

## **БИОЛОГИЯ. МЕДИЦИНА**

### **отрывок на резюме**

The bacterial metagenome is vast and bacteria are promiscuous. Rare gene transfer events can be clinically significant, but this vastness makes it very difficult to pinpoint when and where gene transfer events have led to acquired resistance in human pathogens and, in turn, demonstrate causality. However, our expanding understanding of the ancient origin and modern evolution of antibiotic resistance genes have demonstrated the important role of the environment in both the emergence and spread of resistance. Various human activities have contributed to the rapid evolution of antibiotic resistance since the start of the antibiotic era.

Resistant organisms disseminate from humans to animals, and vice versa, often through various environmental pathways, including foodstuffs, animal wastes, and water sources. However, although food products may have the established maximum antibiotic residue limits, there is no threshold guidance regarding the presence of resistant bacteria or resistance determinants in water sources. Current water quality guidelines tend to focus only on specific bacteria, but do not have appropriate guidance for the presence of antibiotics introduced by manufacturers, domestic disposal, agriculture, and/or the medical sector. In addition, other environmental sources of antibiotics and resistance genes, such as human and agricultural wastes, lack strong guidance, particularly for risk management. Therefore, new guidance is needed and actions taken to reduce selection pressures in natural and farmed/aquaculture environments and also to reduce human exposure rates to resistant strains. A priority should include risk management to minimize antibiotic residues and resistant bacteria in intensive animal facilities as well as from aquaculture. Pruden et al have recommended the use of composting and manure digestion for the degradation of any residual antibiotic present in animal manure, as well as the need for better rearing methods for fish to decrease the levels of disease and the need for regulations and monitoring for antibiotic use in aquaculture. In addition, several

recommendations were made for the removal of antibiotics or antibiotic resistance genes present at wastewater treatment plants, looking at different components of the water cleaning process as critical control points. Nevertheless, increasing antibiotic resistance will not be reversed only by removing selective pressure. The rate of resistance acquisition from intrinsic sources must be reduced, especially to human pathogens, and this can only be done through much greater consideration of the natural environment in resistance transmission. A One Health approach is clearly needed to address all the different contributions that assist in the development and dissemination of antimicrobial-resistant organisms. Having all the sectors working independently is not sufficient; communications and collaborations must be strengthened to be effective and have an impact.

*(From Rita L. Finley<sup>1</sup>, Scott A. McEwen<sup>4</sup>, Richard Reid-Smit, (2013), The Scourge of Antibiotic Resistance: The Important Role of the Environment. Clinical Infectious Diseases, Volume 57, Issue 5, Pp. 704-710).*

#### **отрывок на перевод**

Endothelial cells (ECs), which line the blood vessel lumen, are not simply passive barriers but instead function as active gatekeepers that dynamically respond to changes in the microenvironment. Positioned at the interface between the circulating blood components and the surrounding tissue, ECs play a critical role in regulating physiological and pathological processes, including control of microvascular permeability, angiogenesis, coagulation, and inflammation. To perform such diverse functions, ECs exhibit a high degree of heterogeneity across developmental stages [1], vascular classes (i.e., capillary, arteriole, or venule), and tissue types. The microvasculature of various tissues differs on both a structural and functional level in order to meet the specific needs of that tissue. For example, ECs residing in the brain form a continuous, highly impermeable barrier, the blood-brain barrier (BBB), in order to maintain the delicate biochemical balance necessary for proper brain function. Conversely, sinusoidal ECs in the liver are highly discontinuous to facilitate toxin clearance from the bloodstream, while glomerular ECs in the kidney help filter contents of the blood to remove waste products. There exists much interest in generating tissue-specific microvascular endothelial cells (TS-MVECs) *in vitro* for use in both regenerative medicine and tissue modeling applications. Human pluripotent stem cells (hPSCs), specifically human embryonic and induced pluripotent stem cells (hESCs and hiPSCs, respectively), are an attractive source for generating TS-MVECs due to their capacity for extensive self-renewal and ability to differentiate into any somatic cell type. In particular, the ability to derive autologous cells and to study mechanisms of human tissue development *in vitro* makes hPSCs a particularly appealing source of TS-MVECs. Over the last decade, the development and refinement of protocols to differentiate hPSCs to ECs have advanced the understanding of the role that human ECs play in both physiological and pathological tissue states. Recently, several exciting advances have demonstrated hPSC differentiation into ECs that exhibit tissue-specific characteristics. The objective of this review is to summarize these advances and suggest promising directions that may expand the applications of TSMVECs.

*(From Wilson, H. K., Canfield, S. G., Shusta, E. V. and Palecek, S. P. (2014), Concise Review: Tissue-Specific Microvascular Endothelial Cells Derived From Human Pluripotent Stem Cells. STEM CELLS, 32: 3037–3045. doi: 10.1002/stem.1797)*

## отрывок на пересказ

In a functional metagenomic project, the bacterial mix is extracted (sometimes other cells may be present e.g., human from GI tract extractions) from the ecosystem of interest, the DNA is prepared, which is subsequently shot-gun cloned into cloning vector. *E. coli* is usually used as the cloning host although others have been used. The clones are then plated onto antibiotic (the concentration of the antibiotic is such that it will kill the host unless it contains a resistance gene) containing agar. The DNA sequence of the insert is then determined. The type of vector used varies depending on the size of insert required. Bacterial artificial chromosomes (BACs) can typically accept over 70 kb inserts although most libraries are of a smaller average size. The advantage of using BACs is that as well as the antibiotic resistance gene any genetic element in which it is embedded can also be isolated. Furthermore DNA sequences that give indications of the phylogenetic origins of the original host bacteria can be contained in the BAC clone. A disadvantage of using BACs is the low copy number (although this can also be an advantage as the lower copy number vectors are often more stable than higher copy number vectors) and the need for the transcription and translations signals to be efficiently recognized by the host organism. Another potential disadvantage of using BACs is that further analysis, such as mutagenesis, to prove the location of the resistance gene may be required.

Vectors which only accept small inserts can also be used for cloning. These have the advantage of higher copy number and that vector promoters and ribosome binding sites can be fused to the cloned DNA, so the host transcription and translations systems can be used. A disadvantage is that the small size of the insert will not normally allow information about the genetic background of the resistance gene, and there will be little information available about the origin of the original host organism.

(From Peter Mullany, (2014), *Functional metagenomics for the investigation of antibiotic resistance. Virulence* [Volume 5, Issue 3](#), pages 443-447).

## ЖУРНАЛИСТИКА

### отрывок на резюме

Other studies have sought and failed to find significant correlations between journalist gender and news content, yet have made more subtle discoveries, such as gendered differences in the format, tone, or sourcing of articles. In her study of political-campaign coverage, [Lindsey Meeks \(2013\)](#) did not find evidence that reporter gender affected coverage of the candidates themselves, but she did notice that journalists covered different *kinds of offices* in gendered terms—in ways that do not bode well for news coverage of women who run for governor or president.

An alternative proposition—in the industry as well as the academy—has been that for news content to change, women must move into leadership positions in the newsroom and/or the fundamental structures of news institutions must change. [Margaretha Geertsema \(2009\)](#) assessed the outcomes of the “gender mainstreaming” policy of the Inter Press Service, a global news agency focusing on development communication, whose goal was to normalize employment of women at all levels of the organization and coverage of women’s issues in all news content. Drawing on cultural globalization theory, Geertsema concluded that while the concept was well received in theory, in practice the news reporting and content remained predominantly male-driven. One of the most illuminating studies on gender and newsroom management is [Tracy Everbach’s \(2006\)](#) newsroom ethnography of “the only large American newsroom with an all-women management team at the turn of the 21st century,” the *Sarasota Herald-Tribune*, whose

employees reported high job satisfaction due to an open newsroom structure, collaborative decision making, and “family-friendly” work policies (p. 477).

The studies by Geertsema and Everbach remind us of the need for more attention to institutional policy and the importance of a global perspective on gender issues. Recent scholarship also has confirmed that, even as they move into formerly “male” beats such as politics and the economy, women remain under-represented in journalism’s most prestigious sectors, such as editorial boards, op-ed pages, and prize winners. Similarly, although women are nearly half of all bloggers, they author just 10% of the most influential political blogs, as [Dustin Harp and Mark Tremayne \(2006\)](#) discovered in an article using network theory. “The linking hierarchy of the blogosphere prevents women from becoming highly ranked,” they concluded; in a system in which dominance begets more dominance, the authors detected “[o]ld patterns of power and assumptions about the way politics should be played” (pp. 254, 258).

As these scholars suggest future directions for research, news from the industry reminds us that we still lack satisfactory answers to older questions, and that there is an ongoing need for research on gender issues in journalism. The articles included in this special issue are valuable resources as this conversation continues.

*(From Journalism & Mass Communication Quarterly*

*March 2015 92: 35-38, first published on January 20, 2015*

*Carolyn Kitch, JMCQ Associate Editor, Professor of Journalism, Temple University*

*Women in the Newsroom: Status and Stasis)*

#### **отрывок на перевод**

Readers may notice the parallels between the recent experiences of female editors and the fate of Carol Sutton, whose 1974 promotion to managing editor of the Louisville *Courier-Journal* was seen as so groundbreaking that *Time* magazine profiled her among its “Women of the Year” in 1975. [Kimberly Voss and Lance Speere \(2014\)](#) used oral histories and archival research to tell her story and those of other female “firsts.” Research conducted in the 1980s and 1990s about women in broadcast journalism—where they constituted just over one third of the workforce—conveyed their concerns about pay inequities and workplace sexism and their belief that they were valued only for their appearance. [Erika Engstrom and Anthony J. Ferri \(1998\)](#) summarized these studies and reported that, by century’s end, female journalists were even more worried about a different problem: “conflicts between roles of wife/mother and newscaster” (p. 794).

Around the same time, the *Quarterly* published its first major study of another long-term challenge, sexual harassment. [Kim Walsh-Childers, Jean Chance, and Kristin Herzog \(1996\)](#) surveyed and interviewed nearly 400 American newspaperwomen, finding that a third of them had been sexually harassed, yet that many felt there was little they could do about it if they wanted to keep doing their jobs. A decade later, [Marie Hardin and Stacie Shain \(2005\)](#) received the same response from female sports reporters, more than half of whom reported the problem but saw it “as something they must endure as they go about their job duties” (p. 814).

Hardin and Shain also raised the possibility that journalists’ gender might affect reporting practices, editorial decisions, and the content of the news product. Other researchers have asked the same question, and some have answered it affirmatively. In a study confirming the conventional wisdom that men appear more often than women as news subjects and sources, [Cory L. Armstrong \(2004\)](#) nevertheless found that “female writers were more likely to write about women and showcase women in news coverage” (p. 149). [Teresa Correa and Dustin Harp \(2011\)](#) studied coverage of a topic of particular interest to women, the HPV vaccine, by two newspapers, one with more female reporters than the other; their systems analysis revealed

that “the more gender-balanced organization covered the vaccine more frequently and more prominently, and used more diverse themes than its counterpart” (p. 301).

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### **отрывок на пересказ**

The May [2014](#) firing of The New York Times Executive Editor Jill Abramson, the first woman to hold the newspaper’s top editorial position, prompted widespread discussion in the profession and in the academy about continuing discrimination against women in American newsrooms. Amanda Bennett, who in 2006 had met a similar fate after only 3 years as the first female editor of The Philadelphia Inquirer, wrote that for women in journalism, “this event hit like a lightning strike to dry tinder,” not just the firing but the implications that Abramson had brought it on herself by being too “difficult” and by having the nerve to reveal pay inequity ([Bennett, 2014](#), p. A15). During the previous year, the departures of Barbara Walters and Diane Sawyer, like Katie Couric before them, left the face of national television news a very male one.

The problem is not merely anecdotal. “Women are not ascending to the top jobs in any media sector at anywhere near the rate they’re entering the journalism school pipeline,” wrote [Ann Marie Lipinski \(2014\)](#), the former (and first female) editor of The Chicago Tribune, in this year’s Nieman Reports issue titled “Where Are the Women?” (p. 3). By mid-2014, none of the nation’s top-10-circulation daily newspapers and just two of the top-25 papers were under the editorial direction of a woman ([Strupp, 2014](#)). Women comprise only 36% of newsroom staffers, a figure that has remained stagnant for more than three decades ([Bulkeley, 2002](#); [Women’s Media Center, 2014](#)). “The numbers stink, by and large,” said Abramson during her keynote address to the 2014 Association for Education in Journalism and Mass Communication (AEJMC) Conference in Montreal.

Common sense tells us that the story of women in journalism (and other media industries) surely is a narrative of progress. Yet these flatlining statistics and recent developments suggest otherwise. Once again, we are having this conversation. Why?

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*Women in the Newsroom: Status and Stasis)*

## **ПОЛИТИЧЕСКИЕ ПРОЦЕССЫ**

### **отрывок на резюме**

Previous research has tended to examine the structure of this choice in policy terms, most commonly understood in relation to parties’ positions on left-right issues. The rationale for this dates back to Lipset et al.’s early assertion that the working class tend to prefer redistributive policies, and so they vote for parties on the left, whereas the middle class try to resist these claims and so vote for parties on the right. Accordingly, if parties differ in their policy outlook on left-right issues, we would expect the salience (or strength) of the class cleavage to be stronger than if the parties stand for much the same policy outlook. Recent empirical tests of this

hypothesis have received support in a number of different contexts. Oskarson finds that class voting is higher in polarized political contests (with reference to the policy position of extremist parties) in Northern Europe and Scandinavia; Elff finds evidence that social classes respond to the policy offering of political parties in six West European democracies; and country-level case studies have also found policy effects on class voting in Britain and Italy. Collectively, these studies go some way to showing that class voting is not purely a sociological phenomenon, and that the level – or strength of class voting – varies at least partially in response to political choice factors related to policy. But these studies also leave a number of questions unanswered. For example, in the British context the policy polarization thesis helps to explain why New Labour's move to the right, and the ensuing process of policy convergence between Labour and the Conservatives, led to a decline of class voting in the 1990s, but this approach does not shed light on why class voting was so strong in the 1960s and 1970s.

This suggests that there may be other factors at play that condition the relative strength of social cleavages. In this article I build on these insights and examine the structure of political choice from a more sociological perspective, linking the early sociological accounts of class voting and the more recent instrumentalist accounts of policy voting. A key element of the political choice literature on class voting is the link between class position, class interests and policy preferences. Accordingly, voters' perceptions of their interests are shaped by their class position, which in turn means that different social classes prefer different redistributive political programmes. The extent to which the working class feel that their interests are represented by a political party therefore depend on the party's policy platform. But policy representation is of course only one form of political representation, and it may be that voters are also responsive to other aspects of political representation, which hitherto have not been considered. In exploring this possibility, I draw a distinction between political choice based on policy or 'substantive' representation and political choice based on social or 'descriptive' representation.

*(From British Journal of Political Science / Volume 45 / Issue 01 / January 2015, pp 173 - 193  
Published online: 13 November 2013*

*Policy Representation, Social Representation and Class Voting in Britain*

*Oliver Heath Link to this article: [http://journals.cambridge.org/abstract\\_S0007123413000318](http://journals.cambridge.org/abstract_S0007123413000318) )*

#### **отрывок на перевод**

In this article I examine the impact of policy representation and social representation on the extent to which social classes support different political parties. Do voters respond to social cues as well as political cues? What impact, if any, have changes in the social background of political representatives in Britain had on how voters participate in the political process? HOW DOES SOCIAL REPRESENTATION MATTER? Discussion on social representation in political science has tended to focus on whether politicians will enact policies that are beneficial to other members of their social group in the population as a whole. Do female MPs 'better represent' women's issues than men?

Do ethnic minority MPs better represent ethnic minority issues? And do working-class MPs better represent the issues of working-class people? Research on these questions has tended to produce mixed results, and there is ongoing academic debate as to whether descriptive representation leads to substantive (policy) representation.

The arguments for why it might do so have a certain intuitive appeal. MPs from privileged backgrounds may be 'less in touch with the mass electorate' and less in touch with working-class voters. Working-class MPs may also be more likely than upper-class MPs to put

forward or support left-wing policies; it may therefore be harder for the leadership of a leftwing party to change party policy and move to the right when there are many working class MPs within the party who would potentially resist such a move. Indeed, it is notable that Neil Kinnock's attempt to modernize the Labour Party in Britain in the 1980s began with reforming the rules on candidate selection rather than with a drastic overhaul of policy. Although there is a certain amount of controversy over whether there is in fact a link between descriptive and substantive representation, there is much stronger evidence to suggest that the public believe such a link exists. And when it comes to the determinants of voting behaviour, the public perception that this link exists may carry more weight than whether or not the link actually exists in practice. For example, there is a growing body of work that shows, at least as far as voters are concerned, that descriptive (or social representation) matters; all else being equal, people with a given social characteristic prefer candidates or leaders who share that characteristic: women are more likely than men to vote for female candidates, and black people are more likely than white people to vote for black candidates.

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#### **отрывок на пересказ**

Why does the strength of class voting vary over time? Recent research has emphasized factors related to the structure of political choice at the party level. This article examines different aspects of this choice, and investigates whether voters are more likely to respond to the social or policy cues that parties send voters. The results from the British context suggest that the former are more important than the latter. The central implication of this finding is that social representation matters, and that the social background of political representatives influences how voters relate to political parties. The extent to which social divisions within society are expressed politically is a long established topic of controversy. Whereas most of the controversies over description and measurement have been resolved, many controversies over explanation remain. Why has class been such a major influence on voting behaviour in Britain? Why has the impact of class on vote declined over time? And more generally, why does its impact vary? What factors condition the political salience of social divisions? Answers to these questions have tended to fall into one of two camps: those that privilege social structural factors and those that emphasize political choice factors. The former – which dominated the early literature – tended to view political divisions as simple reflections of social conditions. This view is neatly summed up by Lazarsfeld et al., who famously wrote: ‘A person thinks politically as he is socially’.

According to this ‘bottom-up’ approach, changes that have occurred within the electorate over the last fifty years, such as rising living standards, the spread of affluence, social mobility and the emergence of new issues have undermined the salience of traditional group identities and made voters more individualistic. Accordingly, the salience of social divisions has declined over time, and this in turn has led to a decline in class voting, which – despite rising levels of inequality – apparently signifies ‘the successful resolution by political systems of deep-seated conflicts of social interests’. The problems with this account have been well documented. First, on a theoretical level it is somewhat deterministic, and does not pay sufficient attention to how voters respond to the actions of political parties, or how parties themselves mobilize and appeal to different sections of society. Secondly, on an empirical level, these sociological accounts (which emphasize gradual processes of social change and individualization) fail to capture much

real-world variation, and are unable to account for instances when the level of class voting increases as well as decreases. And thirdly, on a methodological level, evidence used to support this account has tended to rely on crude measures of the classvote relationship, such as the Alford Index. More recent accounts of class voting have emphasized the role that parties play in mobilizing social divisions and how voters respond to these mobilization strategies.

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## СОЦИОЛОГИЯ

### отрывок на резюме

However, we must now speak of sociologies *in Britain*, rather than *British sociology*, for, notwithstanding the outcome of the Scottish referendum, one of the consequences of devolution (and its further extension) is that our sociologies are no longer practiced in a common context or with common objects in mind. Whereas in Scotland sociology can address a forward-looking political community, in England, in contrast, public debate remains captured by the past. More to the point, in England, sociology is no longer practiced in a public university system, whose expansion in the 1960s was coterminous with the expansion of sociology itself. Indeed, the marketization of the university is associated with the displacement of the democratic functions of university education (Holmwood [2011](#)). How are we to re-invigorate sociology's jurisdiction, when that jurisdiction in England is increasingly at odds with the centralized research strategies of funding agencies and university managements, where providing useful knowledge for clearly specified beneficiaries is the basis of funding decisions and audit measures (Holmwood [2010](#))?

Piketty's book sets out a research agenda for social science, but it also implies a political and normative agenda. The latter needs to address global issues and interconnections in the past as well as the present. But we need to grasp them in their local contexts and recognize that the 'same' processes will have different consequences deriving from local social structures and interests. Indeed, the arguments necessary to build a 'coalition' to address the inequalities of patrimonial capitalism will differ depending on past path dependencies and new paths taken. One problem, however, is that the emphasis on the 'global', and formulaic hostility to methodological nationalism, will potentially lead us toward a bland 'internationalism', rather than *a globally-aware localism*. The new market regime of higher education stresses the role of universities in an international knowledge economy and audit measures stress international rankings. Whereas, in the past, 'professional standards' and the aspiration for 'objective knowledge' could occur alongside a 'value-relevant' project of modernization and democratization, the 'internationalization' of professional standards occurs alongside their regulation by market forces that are themselves at issue.

Howard Becker's observation about sociology's public position is more potent now than when he first posed it: we provoke the charge of bias, in ourselves and others, by refusing to give credence and deference to an established status order, in which knowledge of truth and the right to be heard are not equally distributed. ([1967](#): 242)

Are we willing to provoke? Or will we allow ourselves to be nudged into acquiescence by the rewards of a higher education system that is increasingly integral to the status order of patrimonial capitalism?

(From *The British Journal of Sociology*

*Special Issue: Piketty Symposium*

[Volume 65, Issue 4, pages 607–618, December 2014](#)



**отрывок на перевод**

Thomas Piketty's *Capital in the Twenty-First Century* (2014) is a major contribution both to social science and to public debate. Uniquely for a book that makes few concessions to a wider readership either in length or technical argument, it has received broad media coverage, especially in the USA.<sup>1</sup> Coverage has been less extensive in the UK, though the *Financial Times* devoted considerable space to it – perhaps indicative of the *FT*'s global and North American audience – with its economics editor, Chris Giles, seeking (unsuccessfully) to rebut its claims.

Yet, on the face of it, the substance of the book is not that novel, even if it is argued with great skill and verve. It painstakingly sets out data on the distribution of income and wealth across the history of capitalism and projects those distributions into the future. Some of this on income inequality is known from previous work by Piketty and his collaborators (Atkinson and Piketty 2007), though the data on wealth across different countries is new. The force of the argument is to challenge Kuznets's (1953) theory that the maturing of capitalism and long-term economic growth would bring about a decrease in income inequality (and, by implication, also of wealth).<sup>3</sup> Kuznets presented data for the years 1913–1948 and his analysis was seen to be further reinforced by postwar developments up to 1975, a period Piketty describes as the '*trente glorieuse*'. It is Piketty's contention that the trend came to an end in the late 1970s and was itself the contingent product of two world wars, rather than something intrinsic to the logic of capitalism itself.

However, rebutting a theory first published in 1953 would hardly seem to be the basis of a *succès de scandale*, especially when the financial crisis of 2008 and the Occupy movement, not to mention the top incomes data base developed by Piketty and his colleagues (Alvaredo et al. n.d), had already brought the extent of widening inequalities since the 1980s to global attention. Indeed, many other commentators, including OECD (2014) in a recent report, have pointed to those inequalities and social divisions as possible threats to social order and democracy, especially in the context of cuts to public expenditure and the politics of austerity pursued by many governments since 2008. But perhaps that is the point. Piketty's book appears to have found a moment when financial elites had begun to have renewed confidence in their ability to weather calls for regulation and to convince political elites of the necessity of paying the 'market price of excellence'. The book challenges this idea.

*(From The British Journal of Sociology*  
*Special Issue: Piketty Symposium*  
*Volume 65, Issue 4, pages 607–618, December 2014*  
*Beyond capital? The challenge for sociology in Britain*  
*John Holmwood)*

**отрывок на пересказ**

Piketty's book marks a significant moment for economics. But what is its significance for sociology? Untypically for an economist, Piketty does not promote economics over other social sciences and he looks forward to his arguments being complemented (even challenged – he is a generous advocate of debate through disagreement, which is one of the reasons why Giles's 'refutation' fell flat after some initial exultation) by contributions from other social scientists. It is here that there is a danger that sociologists respond by feeling confirmed, rather than challenged; that Piketty tells us what we already know and that there is no need to re-think our

own categories and approaches. Indeed, the presentation of his data on distribution in terms of 'deciles' seems crude compared with the sociological interest in classes and social relations. It opens up a sociological response, similar to that of some Marxists,<sup>4</sup> that Piketty provides a wealth of data, but a rather limited analysis of the mechanisms that produce the distributional effects he observes. Equally, feminists have responded that there is little address of gender issues in the book and that it is disappointingly 'business as usual' here, too.<sup>5</sup> Notwithstanding the separate merits of these arguments, I want to suggest that the situation is otherwise and that taking Piketty's arguments seriously will set us some new questions, some of which, if, truly, we knew this stuff, should already have been motivating our research.

I also want to suggest that there are some deep issues in the sociology and politics of knowledge lurking in Piketty's text that also need our attention. After all, the sociology that seemingly 'knows about inequality' was crafted under the 'jurisdiction' of the second downward turn of the Kuznets curve; that is, it was a product of, and committed to, reducing inequality and the modernization of institutions in the light of that trend. What is sociology's jurisdiction when the trend has reversed?

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## **ФИЗИКА**

### **отрывок на резюме**

There has been much recent interest in photonic crystal waveguides.

These are structures formed in photonic crystals for the purpose of channeling the flow of electromagnetic energy. In two-dimensional photonic crystals, which are designed as an array of parallel axes dielectric cylinders with axes arranged in a two-dimensional Bravais

lattice, waveguides are created by either removing or replacing a row of the photonic crystal cylinders. By choosing the dielectric properties of the photonic crystal and/or the replacement cylinders correctly, electromagnetic guided wave modes become trapped in the waveguide channel where they then move along the channel in a direction perpendicular to the cylinder axes. The energy flow carried by electromagnetic waves along the waveguide channel is in many respects similar to the energy flow accompanying the motion of electrons in electronic circuits. This has suggested the investigation of the properties of photonic crystal based optical systems that give analogies of electronic circuit behaviors.

An important feature, in such a comparison of the optical and electronic systems, is that in some cases the response of the energy flow in photonic crystal systems to time variations can be much faster than that found in analogous electronic systems. This may be of considerable interest in computational and information related processes because, just as in electronics, circuits of photonic crystal waveguides can be made by connecting waveguides together into complex flow patterns for the manipulation and modification of energy signals. Consequently, it has been proposed, as part of the study of Opto-Electronics, that circuits formed of photonic crystal waveguides be used to complement and perhaps improve upon their electronic counterparts in various types of technological applications.

Many of the important properties of electrical circuits involve the application of nonlinear responses that occur in electronic materials. Such applications are seen, for example, in

transistors and diodes. As a result, in order to arrive at complete optical analogies of electronic circuits it is necessary to develop the study of optical nonlinearities in photonic crystal waveguide structures. This will be one of the foci of the studies presented in this chapter. The nonlinearities in optical systems arise from the dependence of the dielectric constants of some of the materials in the systems on the electric fields that are applied to them. Numerous suggestions have been made for the development of photonic crystals containing nonlinear components in designs which include, for example, switches, transistors, etc. These are based on the application of Kerr nonlinearity properties of various optical materials. In addition, an important problem in optics is the development of devices which change the frequency of light through the generation of second harmonics. These are based on the second harmonic generation properties possessed by specific types of materials, and ideas of photonic crystals and photonic crystal waveguides have been successfully applied to improve the generation of second harmonics for use in various optical applications.

*(From ENCYCLOPEDIA OF PHYSICS RESEARCH, editors Nancy b. Devins and Jillian P. Ramos*

*2012 by Nova Science Publishers, Inc.*

*TRANSMISSION THROUGH KERR MEDIA BARRIERS WITHIN WAVEGUIDES: DEVICE APPLICATIONS, 835-855 p.*

*A.R. McGurn, Department of Physics, Western Michigan University, Kalamazoo, Michigan)*

#### **отрывок на перевод**

Recently, we have presented general discussions of the type outlined above for the modes resonantly excited within certain forms of barriers and junctions composed of nonlinear optical media that are contained within or connect a number of photonic crystal waveguides formed of linear dielectric media. It was shown there, and will be explained later, that the dielectric properties of the Kerr material are characterized by two parameters and that these two parameters can be used to develop a classification scheme for the barrier modes of the nonlinear system. One parameter gives the dielectric constant of the Kerr material in the limit of zero applied electric field and the other gives the dependence of the Kerr dielectric constant on the intensity of the applied electric field. It was shown that by studying the transmission characteristics of guided modes through the Kerr barrier and junctions as functions of the two parameters characterizing the Kerr media, a series of transmission maxima or resonances are located as points in the two-dimensional space defined by the two parameters characterizing the Kerr media of the barrier or junction. These transmission resonances were shown to be associated with the excitation of resonant modes within the barrier and junctions. The types of modes found included: Fabry-Perot modes, intrinsic localized modes, dark soliton modes, etc. A mapping of the transmission maxima within the two-dimensional parameter space of the Kerr parameters allowed for the association of mode types resonantly excited within the barrier and junctions (i.e., Fabry-Perot, intrinsic localized, etc.) with features (i.e., lines or ridges) occurring in the pattern of transmission resonances in the two-dimensional Kerr parameter space. This offers a useful scheme for understanding the conditions needed for the observation of resonant transmission in barriers and junctions and a classification of the excitations found within the barriers and junctions under specific resonant conditions. A visualization of the solutions of the nonlinear system results, allowing for an understanding of the origin of the various types of modes present in the system. The visualization is similar to other types of visualizations that have been employed successfully in the study of the dynamics of a variety of nonlinear dynamical systems, e.g., biological populations, economic models, nonlinear oscillators, etc.

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### **отрывок на пересказ**

In this Chapter we will look at some general properties of nonlinear systems exhibited in simple designs based on photonic crystal waveguides. The focus will be on those systems having Kerr nonlinear components. We will look at designs based on modifications of photonic crystals and photonic crystal waveguides formed of linear dielectric media. Into the photonic crystal waveguide we introduce barriers formed of Kerr nonlinear media, barriers formed of Kerr nonlinear media that contain impurity sites within the barrier, and barriers formed of Kerr nonlinear media which have side couplings formed by cylinder replacement within the photonic crystal adjacent to the barrier. The object of our studies is to look at the scattering of guided modes from these types of barriers of nonlinear Kerr media and how the scattering can be used in device applications.

The types of problems addressed are generalizations of the barrier transmission problem studied in quantum mechanics. The difference between our systems and the well known quantum mechanical system, however, is that the properties of the barrier media in our problems depends on the intensity of the field of the wave propagating within it.

This greatly changes the scattering and transmission from the barrier and leads to completely new types of excitations which are resonantly excited within the barrier media. When the barrier is composed only of linear dielectric media, the system exhibits a series of transmission resonances, as a function of the dielectric properties of the barrier, arising from the resonant excitation of Fabry-Perot modes within the barrier media. When the barrier contains Kerr nonlinear dielectric media, however, the system exhibits a series of transmission resonances, as a function of the dielectric properties of the barrier, arising from the resonant excitation of Fabry-Perot modes, intrinsic localized modes, dark soliton modes, etc.

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## **ИСТОРИЯ**

### **отрывок на резюме**

The idea that war-induced brutalization may be temporary and dependent on the context of war itself is not new. It was first formulated by Sigmund Freud in his ‘Thoughts for the Times on War and Death’ (1915). Reacting to a fear widespread among his contemporaries, the psychoanalyst queried the notion that the war had destroyed civilized man, reverted him to an earlier stage of his development, and barbarized or brutalized him. The ‘brutality shown by individuals whom, as participants in the highest human civilization, one would not have thought

capable of such behaviour', he noted, was disillusioning. But it was also just that: 'the destruction of an illusion'. Civilization had not, he maintained, replaced the primitive impulses with higher ones. Rather, both levels of human development coexisted, and in many cases civilization was but a veneer of hypocrisy enforced by society.

'In reality', he noted, 'our fellow-citizens have not sunk so low as we feared, because they had never risen so high as we believed'. Yes, he continued, wartime experience might well lead to permanent regression into barbarism. More likely, however, such involution was temporary: 'We need not deny susceptibility to culture to all who are at the present time behaving in an uncivilized way, and we may anticipate that the ennoblement of their instincts will be restored in more peaceful times'. Once the environment enabling killing was abandoned, once soldier returned to their families, civil life would resume:

"When the furious struggle of the present war has been decided, each one of the victorious fighters will return home joyfully to his wife and children, unchecked and undisturbed by thought of the enemies he has killed whether at close quarters or at long range".

Joanna Bourke's influential study of face-to-face combat stands in the tradition of Freud's reflections. The widespread 'assumption that men trained to kill in war would carry on killing after the war', she noted, 'was based on a false notion of the "killer personality"', which ignored that under the right circumstances, quite ordinary people 'delighted' in killing fellow human beings. Once these circumstances changed, once the 'external props of the "theatre of war"' were removed', she continued, 'only a tiny minority of men could continue exulting in the slaughter'. For Bourke, what happened after a war had come to an end was more important than the experience of combat, however savage. The relatively high incidence of 'disturbed, angry, and aggressive veterans' after the Vietnam War, for example, stemmed not from any 'habit of violence' acquired on the battlefield, but 'from the feeling of having been "fucked over"' by military and civilian society on the return home'. The process of demobilization itself played a central part in this failed transition to civilian life. Rather than the 'leisurely process' of prolonged demobilization aboard troop ships typical of the two world wars, American veterans of the Vietnam War returned very fast and as a rule alone, often facing a hostile reception as baby killers rather than a hero's welcome.

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*The Limits of Demobilization: Global Perspectives on the Aftermath of the Great War*

*Mark Edele, University of Western Australia, Australia*

*Robert Gerwarth, University College Dublin, Republic of Ireland)*

#### **отрывок на перевод**

While the Russian case was extreme and specific, once extant, it changed the field of play for all other warring nations. The effect of Russia's revolution and its swift descent into the chaos of civil war was immediately felt elsewhere, even in countries like Britain and France, or even in the USA<sup>25</sup> or Australia, where a Bolshevik revolution was highly unlikely. The largely fantastic fear of a Bolshevik take-over of the entire old world exerted a powerful influence on the political imagination of Europeans after Lenin came to power in Russia. Partly propaganda and partly a genuine concern of those who had more to lose than their chains, Bolshevism quickly became synonymous with the elusive threats and underhand enemies that apparently menaced postwar societies. The morbid fantasy of encirclement by nihilistic forces of disorder inspired conservative and counterrevolutionary politics across the globe, but it played out in different ways. Where victory in the Great War had strengthened the state and its institutions, anti-Bolshevik mythology also served to stabilize the existing system by rallying those prepared to defend it against 'chaos'. In the loser states of Europe, anti-Bolshevism offered a convenient

explanation as to why the war had been lost, why the old regimes had been toppled and why chaos ruled over much of Eastern and Central Europe. Anti-Bolshevism – usually coupled with anti-Semitism – gave paramilitary responses a direction and a goal; it helped to make the illusive enemy identifiable, drew on familiar resentments against the urban poor, the Jews and ‘disorder’ more generally.

The precise role of anti-Bolshevism thus varied depending on the space and political context in which it occurred. It found its most violent expressions in Central and Eastern Europe between 1918 and 1923.<sup>26</sup> The Revolution had the potential to mobilize people for a civil war without any previous wartime brutalization. The case of Finland illustrates that point. Although not a combatant in the First World War, Finland experienced one of the bloodiest civil wars of the immediate postwar period. Although individual volunteers from Finland had fought in both the German and the Russian armies during the war, the vast majority of the roughly 200,000 men engaged in the subsequent (and, with 36,000 casualties within less than six months, particularly brutal) civil war had no war experience whatsoever.

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#### **отрывок на пересказ**

To be sure, the war’s total mobilization of resources and manpower strained all combatant states. Even in those winner states like France or Britain that managed to exit the war without facing serious postwar unrest or revolutions, the period after 1918 was filled with economic uncertainty and political disenchantment.

While the majority of veterans returned to peaceful civilian existences, many of them still felt alienated by broken political promises, unemployment, estranged wives and children. Reabsorbing millions of men into civilian life was thus a daunting proposition even for the victor states. In Britain, hastily demobilized soldiers flocked home to their pre-war jobs, exacerbating what was already a dangerously overheated postwar boom. Nevertheless, these problems did not lead to a serious challenge of the state’s monopoly on violence. Ultimately, the reintegration of veterans into civilian life proved successful, and violence was transitory or absent altogether. Indeed, in metropolitan France and Britain and their empires, the war had the opposite effect: as Richard Fogarty and David Killingray argue, it strengthened the state and indeed the empire (a point also made by Stephen Garton with reference to empire nationalism).

In Russia, by contrast, the war acted as a ‘forcing-house for the seeds of revolution’.

The exertions of wartime disintegrated state power, releasing the forces of revolution and civil war, a transformation explored in Dietrich Beyrau’s article.

In Germany, meanwhile, the temporary collapse in the Revolution of 1918 was quickly countered by the new, Social Democratic rulers, in alliance with what elsewhere would have become warlords – the Freikorps. Once the latter had put down the competing agents of violence, the newly emergent state rebuilt a monopoly of force strong enough to emancipate itself from the right-wing groups.

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## НАУКИ О ЗЕМЛЕ

### отрывок на резюме

#### Offshore

Offshore, depending on size and water depth, a whole range of different structures are used. In the last few years, we have seen pure sea bottom installations with multiphase piping to shore and no offshore topside structure at all. Replacing outlying wellhead towers, deviation drilling is used to reach different parts of the reservoir from a few wellhead cluster locations. Some of the common offshore structures are:

Shallow water complex, characterized by a several independent platforms with different parts of the process and utilities linked with gangway bridges. Individual platforms will be described as Wellhead

Platform, Riser Platform, Processing Platform, Accommodations Platform and Power Generation Platform. The picture shows the Ekofisk Field Centre by Phillips petroleum. Typically found in water depths up to 100 meters.

Gravity Base. Enormous concrete fixed structures placed on the bottom, typically with oil storage cells in the “skirt” that rests on the sea bottom. The large deck receives all parts of the process and utilities in large modules. Typical for 80s and 90s large fields in 100 to 500 water depth. The concrete was poured at an at shore location, with enough air in the storage cells to keep the structure floating until tow out and lowering onto the seabed. The picture shows the world’s largest GBS platform, the Troll A during construction.

Compliant towers are much like fixed platforms. They consist of a narrow tower, attached to a foundation on the seafloor and extending up to the platform. This tower is flexible, as opposed to the relatively rigid legs of a fixed platform. This flexibility allows it to operate in much deeper water, as it can 'absorb' much of the pressure exerted on it by the wind and sea. Compliant towers are used between 500 and 1000 meters water depth.

Floating production, where all topside systems are located on a floating structure with dry or subsea wells. Some floaters are:

FPSO: Floating Production, Storage and Offloading. Typically a tanker type hull or barge with wellheads on a turret that the ship can rotate freely around (to point into wind, waves or current). The turret has wire rope and chain connections to several anchors (position mooring - POSMOR), or it can be dynamically positioned using thrusters (dynamic positioning – DYNPOS). Water depths 200 to 2000 meters. Common with subsea wells. The main process is placed on the deck, while the hull is used for storage and offloading to a shuttle tanker. May also be used with pipeline transport. A Tension Leg Platform (TLP) consists of a structure held in place by vertical tendons connected to the sea floor by pile-secured templates. The structure is held in a fixed position by tensioned tendons, which provide for use of the TLP in a broad water depth range up to about 2000m. Limited vertical motion. The tendons are constructed as hollow high tensile strength steel pipes that carry the spare buoyancy of the structure and ensure limited vertical motion. A variant is Seastar platforms which are miniature floating tension leg platforms, much like the semi submersible type, with tensioned tendons.

*(From Depression as a mediator of negative cognitive style and hopelessness in stress generation*

*Evan M. Kleiman<sup>1,\*</sup>, Richard T. Liu<sup>2</sup>, John H. Riskind<sup>1</sup> and Jessica L. Hamilton<sup>3</sup>*

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*British Journal of Psychology*

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## отрывок на перевод

### Metering, storage and export

Most plants do not allow local gas storage, but oil is often stored before loading on a vessel, such as a shuttle tanker taking the oil to a larger tanker terminal, or direct to crude carrier. Offshore production facilities without a direct pipeline connection generally rely on crude storage in the base or hull, to allow a shuttle tanker to offload about once a week. A larger production complex generally has an associated tank farm terminal allowing the storage of different grades of crude to take up changes in demand, delays in transport etc. Metering stations allow operators to monitor and manage the natural gas and oil exported from the production installation. These metering stations employ specialized meters to measure the natural gas or oil as it flows through the pipeline, without impeding its movement. This metered volume represents a transfer of ownership from a producer to a customer (or another division within the company) and is therefore called Custody Transfer Metering. It forms the basis for invoicing sold product and also for production taxes and revenue sharing between partners and accuracy requirements are often set by governmental authorities. Typically the metering installation consists of a number of meter runs so that one meter will not have to handle the full capacity range, and associated prover loops so that the meter accuracy can be tested and calibrated at regular intervals. Pipelines can measure anywhere from 6 to 48 inches in diameter. In order to ensure the efficient and safe operation of the pipelines, operators routinely inspect their pipelines for corrosion and defects. This is done through the use of sophisticated pieces of equipment known as pigs. Pigs are intelligent robotic devices that are propelled down pipelines to evaluate the interior of the pipe. Pigs can test pipe thickness, and roundness, check for signs of corrosion, detect minute leaks, and any other defect along the interior of the pipeline that may either impede the flow of gas, or pose a potential safety risk for the operation of the pipeline. Sending a pig down a pipeline is fittingly known as 'pigging' the pipeline. The export facility must contain equipment to safely insert and retrieve pigs from the pipeline as well as depressurization, referred to as pig launchers and pig receivers. Loading on tankers involve loading systems, ranging from tanker jetties to sophisticated single point mooring and loading systems that allow the tanker to dock and load product even in bad weather.

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## ПСИХОЛОГИЯ

### отрывок на резюме

Based on the original framework of the hopelessness theory of depression (Abramson et al., 1989), it could be that depression symptoms mediate the relationship between depressogenic risk factors, such as hopelessness and negative cognitive styles, and negative dependent events



(pictured on the left side of Figure 1; models 1 and 3). Surprisingly, this important question about the mediating sequence between cognitive risk factors and negative dependent events has received minimal attention. However, it is important to determine whether (1) the stress generation effects are actually because depression induces hopelessness; (2) the reverse is true and hopelessness (or negative cognitive style) induces depression; or (3) both are true. However, an additional alternative possibility is that hopelessness or depression symptoms have direct (partially independent) effects that are not mediated by the other. Suggestive of the latter possibility, negative cognitive style, the more distal risk factor for depression in the hopelessness model, has been found to predict negative dependent events, even controlling for depression symptoms (Hamilton et al., 2014; Safford et al., 2007; Shih et al., 2008). Earlier research finds that individuals with a negative cognitive style are more likely to experience stressful life events, which are probably related to their own behaviour, such as poorer academic performance (Peterson & Barrett, 1987), risky gambling (Atlas & Peterson, 1990) and negative health outcomes (Lin & Peterson, 1990; Peterson, Seligman, & Vaillant, 1988).

Although these studies provide preliminary support for the independent role of negative cognitive style in stress generation, these studies have limited generalizability because the samples were selected based on cognitive risk to depression or included samples of children and early adolescents. More specifically, the study by Safford et al. (2007) selected participants based on having high or low cognitive risk for, and no current or past symptoms of, depression. Thus, this study excluded participants in the middle range of risk or with any past depression symptoms by design. The studies by Shih et al. (2008) and Hamilton et al. (2013, 2014) were conducted among a sample of early adolescents, which is a developmental period during which cognitive risk factors have not yet coalesced and may not yet be stable risk factors for depression (Cole et al., 2008). Thus, no study to date has examined if negative cognitive style predicts negative dependent events because it contributes to higher levels of depression symptoms, or even hopelessness. This leaves the important question still open as to whether negative cognitive styles typically have direct effects on negative dependent events in a normal population, or whether negative cognitive styles contribute to the generation of negative dependent events through other factors, such as depression symptoms.

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Although past research (e.g., Joiner, Wingate, Gencoz, & Gencoz, 2005; Joiner, Wingate, & Otamendi, 2005; Safford et al., 2007) has shown that negative cognitive style and hopelessness are associated with stress generation (i.e., the generation of negative dependent events) over time, we demonstrated that such effects are mediated at least in part by depression symptoms. In other words, individuals who are cognitively at risk of depression may experience difficulties in interpersonal relationships in part because they are depressed. Thus, such cognitive risk factors may influence stress generation in large part through their effect on depression. We tested this theory in three related hypotheses. First, we found that depression symptoms mediated (1) the hopelessness–negative dependent event relationship (model 1) and (2) the negative cognitive style–negative dependent event relationship (model 3). However, we did not find evidence for the alternate models, in which hopelessness and negative cognitive style mediated

the relationship between depression symptoms and negative dependent events (models 2 and 4). Finally, we found support for a model that integrated the first and second hypotheses, finding that first hopelessness and then depression symptoms mediated the negative cognitive style–negative dependent event relationship (model 5).

The current study provides a novel contribution to the literature by finding evidence that depression symptoms mediate the effects of depressogenic risk factors and negative dependent events. These findings suggest that individuals who have negative cognitive styles and experience hopelessness are more likely to experience negative dependent events in large part because of the depression engendered by these cognitive risk factors. Moreover, the study provides evidence for the specific temporal sequence of cognitive risk factors being mediated by depression, rather than the opposite sequence. That is, we found no support for the reverse sequence where the effect of depression on negative independent events was mediated by hopelessness and negative cognitive style. Overall, these findings are consistent with the hopelessness theory of depression and our hypothesized models in which depression mediates the impact of cognitive factors with stress generation.

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In the present short-term, prospective study, we sought to integrate the findings on negative cognitive styles and hopelessness in stress generation (e.g., Safford et al., 2007; Shih et al., 2008; Joiner, Wingate, Gencoz, & Gencoz, 2005; Joiner, Wingate, & Otamendi, 2005) into a mediational framework. Thus, three hypothesized mediational models were examined to test the specificity of direction in which depression symptoms mediated the relationship between hopelessness and negative dependent events (model 1) and negative cognitive style and negative dependent events (model 3). We also tested the reverse of these two models where hopelessness and negative cognitive style mediated the relationship between depression symptoms and negative dependent events (models 2 and 4), respectively. Finally, we tested a mediational model that involved all variables in the same model (model 5) pictured in Figure 2. Specifically, we tested whether the relationship between negative cognitive style and negative dependent events was mediated by (1) hopelessness followed by (2) depression symptoms.

Consistent with the hopelessness theory of depression (Abramson et al., 1989), we hypothesized that depression symptoms would mediate the relationship between hopelessness and negative dependent events, but did not expect to find the reverse model of stress generation, where hopelessness mediates the relationship between depression symptoms and negative dependent events. Although we propose a different pathway from that proposed by Joiner, Wingate, Gencoz, and Gencoz (2005), we suggest this pathway as complementary to the original findings. It is important to consider that there are likely multiple pathways to the generation of negative dependent events. The present study will add to this body of literature by providing additional pathways in stress generation.

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## **ЭКОНОМИКА**

### **отрывок на резюме**

In other words, many industries fall somewhere between the polar cases of perfect competition and monopoly. Economists call this situation imperfect competition.

One type of imperfectly competitive market is an oligopoly, a market with only a few sellers, each offering a product that is similar or identical to the products offered by other sellers in the market. Economists measure a market's domination by a small number of firms with a statistic called the concentration ratio, which is the percentage of total output in the market supplied by the four largest firms. In the U.S. economy, most industries have a four-firm concentration ratio under 50 percent, but in some industries, the biggest firms play a more dominant role. Highly concentrated industries include the market for electric lamp bulbs (which has a concentration ratio of 75 percent), breakfast cereal (80 percent), aircraft manufacturing (81 percent), household laundry equipment (98 percent), and cigarettes (98 percent). These industries are best described as oligopolies. In the next chapter we see that the small number of firms in oligopolies makes strategic interactions among them a key part of the analysis.

That is, in choosing how much to produce and what price to charge, each firm in an oligopoly is concerned not only with what its competitors are doing but also with how its competitors would react to what it might do.

A second type of imperfectly competitive market is called monopolistic competition. This describes a market structure in which there are many firms selling products that are similar but not identical. In a monopolistically competitive market, each firm has a monopoly over the product it makes, but many other firms make similar products that compete for the same customers.

To be more precise, monopolistic competition describes a market with the following attributes:

- Many sellers: There are many firms competing for the same group of customers.
- Product differentiation: Each firm produces a product that is at least slightly different from those of other firms. Thus, rather than being a price taker, each firm faces a downward-sloping demand curve.
- Free entry and exit: Firms can enter or exit the market without restriction. Thus, the number of firms in the market adjusts until economic profits are driven to zero.

A moment's thought reveals a long list of markets with these attributes: books, DVDs, computer games, restaurants, piano lessons, cookies, clothing, and so on.

Monopolistic competition, like oligopoly, is a market structure that lies between the extreme cases of perfect competition and monopoly. But oligopoly and monopolistic competition are quite different. Oligopoly departs from the perfectly competitive ideal of Chapter 14 because there are only a few sellers in the market. The small number of sellers makes rigorous competition less likely and strategic interactions among them vitally important. By contrast, a monopolistically competitive market has many sellers, each of which is small compared to the market. It departs from the perfectly competitive ideal because each of the sellers offers a somewhat different product.

*(From Principles of Microeconomics, 7 edition  
N. Gregory Mankiw, Professor of Economics at Harvard University  
2015, 2012 Cengage Learning)*

#### **отрывок на перевод**

In this chapter, we examine the implications of this market power. We will see that market power alters the relationship between a firm's costs and the price at which it sells its product. A competitive firm takes the price of its output as given by the market and then chooses the quantity it will supply so that price equals marginal cost. By contrast, a monopoly charges a price that exceeds marginal cost.

This result is clearly true in the case of Microsoft's Windows. The marginal cost of Windows—the extra cost that Microsoft incurs by printing one more copy of the program onto a CD—is only a few dollars. The market price of Windows is many times its marginal cost.

It is not surprising that monopolies charge high prices for their products.

Customers of monopolies might seem to have little choice but to pay whatever the monopoly charges. But if so, why does a copy of Windows not cost \$1,000? Or \$10,000? The reason is that if Microsoft were to set the price that high, fewer people would buy the product. People would buy fewer computers, switch to other operating systems, or make illegal copies. A monopoly firm can control the price of the good it sells, but because a high price reduces the quantity that its customers buy, the monopoly's profits are not unlimited.

As we examine the production and pricing decisions of monopolies, we also consider the implications of monopoly for society as a whole. Monopoly firms, like competitive firms, aim to maximize profit. But this goal has very different ramifications for competitive and monopoly firms. In competitive markets, selfinterested consumers and producers reach an equilibrium that promotes general economic well-being, as if guided by an invisible hand. By contrast, because monopoly firms are unchecked by competition, the outcome in a market with a monopoly is often not in the best interest of society.

One of the Ten Principles of Economics in Chapter 1 is that governments can sometimes improve market outcomes. The analysis in this chapter sheds more light on this principle. As we examine the problems that monopolies raise for society, we discuss the various ways in which government policymakers might respond to these problems. The U.S. government, for example, keeps a close eye on Microsoft's business decisions. In 1994, it blocked Microsoft from buying

Intuit, a leading seller of personal finance software, on the grounds that combining the two firms would concentrate too much market power.

*(From Principles of Microeconomics, 7 edition  
N. Gregory Mankiw, Professor of Economics at Harvard University  
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##### **How Price Floors Affect Market Outcomes**

To examine the effects of another kind of government price control, let's return to the market for ice cream. Imagine now that the government is persuaded by the pleas of the National Organization of Ice-Cream Makers whose members feel the \$3 equilibrium price is

too low. In this case, the government might institute a price floor. Price floors, like price ceilings, are an attempt by the government to maintain prices at other than equilibrium levels. Whereas a price ceiling places a legal maximum on prices, a price floor places a legal minimum.

When the government imposes a price floor on the ice-cream market, two outcomes are possible. If the government imposes a price floor of \$2 per cone when the equilibrium price is \$3, we obtain the outcome in panel (a) of Figure 4. In this case, because the equilibrium price is above the floor, the price floor is not binding.

Market forces naturally move the economy to the equilibrium, and the price floor has no effect. Panel (b) of Figure 4 shows what happens when the government imposes a price floor of \$4 per cone. In this case, because the equilibrium price of \$3 is below the floor, the price floor is a binding constraint on the market. The forces of supply and demand tend to move the price toward the equilibrium price, but when the market price hits the floor, it can fall no further. The market price equals the price floor. At this floor, the quantity of ice cream supplied (120 cones) exceeds the quantity demanded (80 cones). Some people who want to sell ice cream at the going price are unable to. Thus, a binding price floor causes a surplus.

Just as the shortages resulting from price ceilings can lead to undesirable rationing mechanisms, so can the surpluses resulting from price floors. The sellers who appeal to the personal biases of the buyers, perhaps due to racial or familial ties, may be better able to sell their goods than those who do not. By contrast, in a free market, the price serves as the rationing mechanism, and sellers can sell all they want at the equilibrium price.

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## ФИЛОСОФИЯ

### отрывок на резюме

#### Newton's Spatial Criterion for Existence

In this section I will show that Newton adhered to a certain metaphysical axiom or principle. This principle holds that the existence of space is a necessary condition for the existence of anything else. One particularly succinct and forceful presentation of this Newtonian claim comes from *Tempus et Locus*. Newton begins this manuscript by writing that ‘Time and Place are common affections of all things without which nothing whatsoever can exist.’ *De Gravitatione* contains very similar language: ‘Space is an affection of being just as being. No being exists or can exist which is not related to space in some way. God is everywhere, created minds are somewhere, and body is in the space that it occupies; and whatever is neither everywhere nor anywhere does not exist. And hence it follows that space is an emanative effect of the first existing being, for if any being whatsoever is posited, space is posited.’ I think these texts are sufficient to demonstrate that Newton held the following:

Spatial Criterion for Existence (SCE): For any being to exist it must exist in space.

There are two important features of the SCE which deserve attention and there are two important questions about the SCE which deserve discussion. The two features are its modal status and its scope. The SCE has the modal status of necessity. For a being to exist, it must exist

in space. Existing things necessarily exist in space. The scope of the SCE is universal. For any being to exist it must exist in space. All beings require space to exist in. The necessity and universality of the SCE embed it deeply in Newton's conceptual thought; it acts as a grounding or fundamental metaphysical principle.

The first interesting question about the SCE is why did Newton adhere to the SCE? Providing a complete answer to this question is outside the scope of this paper, but there are two considerations which I think are relevant.

The first relevant consideration is the fact that Henry More also held a version of the SCE. Consider the following passage from the preface to his *Immortality of the Soul*: 'For, to take away all Extension, is to reduce a thing onely to a Mathematical point, which is nothing else but pure Negation or Non-entity ... it is plain that if a thing be at all, it must be extended.' We know that Newton was a careful reader of More and thought highly of him. It is possible he simply adopted this view from More. But the mere fact that More held a similar position, or that such a position was 'in the air' at the time, does not really supply us with a reason for Newton to have held the SCE, it can only be a relevant consideration. Furthermore, as we saw above, and as his student notebooks make clear, Newton was certainly no slavish adherent of More's views. This brings us to the second relevant consideration.

Newton may have believed that the SCE was a logical truth. He may have rejected the very coherence of existing objects which were unextended. Now there is a sense in which this is not really an argument. But it is worth noting that early modern philosophers (not entirely unlike some of their modern-day counterparts) placed an extremely high level of emphasis on the conceivability of various metaphysical views.

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*Space Before God? A Problem in Newton's Metaphysics*

Patrick J. Connolly)

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On the view I am proposing, in which God and space are ontologically distinct, we can make perfect sense of this passage. We can conceive of space without God because they are distinct things.

Gorham has denied that this is a decisive text against the attribute interpretation. His argument is that Newton is operating within a Cartesian context where it is possible to conceive of extension without God. Newton, according to Gorham, must reject this possibility on pain of being complicit in this atheism. I think Gorham has this backwards. Descartes makes it abundantly clear that extension cannot be conceived apart from God, this is why extension is not, properly speaking, a substance. So given that it is not Descartes' position that God and extension can be conceived distinctly, it follows that it must be Newton's position that we can conceive of space apart from God. Further evidence that Newton is speaking in his own voice (and not channeling Descartes) comes from the fact that he claims that extension is not created and has existed eternally. Again, this is a position which is clearly Newton's and is clearly not Descartes'. How, given that he thinks space can be conceived apart from God, does Newton avoid the charge of atheism? Newton claims that although conceiving of space does not require conceiving of God, conceiving of bodies does (as Gorham goes on to note). So what Newton is attacking in this passage is the Cartesian equation of bodies with space; it is this conflation, and not the ontological distinction between God and space, that leads to atheism.

A second view about attributes treats them more like properties. On this view, attributes are things that inhere in their substances. So on this understanding of attributes, space inheres in God. I think this cannot be Newton's view. Consider this passage from *De Gravitatione*: 'And much less may [space] be said to be nothing, since it is something more than an accident, and approaches more nearly to the nature of a substance.' If Newton really did think of space as this sort of divine attribute then presumably it would be more natural to speak of space as an accident than to speak of it as a substance. On the view which identifies God with space, space is dependent on God for its being which makes it entirely unlike a substance. But here we have Newton claiming that it is more like a substance (which has its own being) than like an accident (which inheres in a substance).

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Here again we have Newton insisting that the relationship between space and God is extremely tight, yet still denying that they are the same thing. Space is more like an effect of God than like a feature or part of God.

So much for Newton's direct claims about the non-identity of space and God. I now want to consider some passages which motivate indirectly against the divine attribute reading. But in order to see how these passages do this it is necessary to say a little bit about how early modern philosophers thought about attributes. There are, broadly speaking, two ways of thinking about attributes: either as 1) ways of conceiving a substance or as 2) features of a substance which inhere in it. I think Newton makes claims about space which are inconsistent with space being an attribute according to either conception.

The first view about attributes holds that an attribute is just a manner in which a substance is conceived. Omnipotence, for example, on this view is just one way of thinking about the perfectly simple substance that is God. So space, on this view is just one way of considering the divine essence; thinking about space is really just thinking about God. Henry More seemed to favor this understanding of space as a divine attribute. He often claims that space is an 'image' or a 'representation' of God. He means that space is one of the ways in which human minds imagine, represent, or conceive of God. I think that Newton could not have shared this view with More. The reason is that Newton believes we can conceive of space without conceiving of God. Consider the following passage:

If we say with Descartes that extension is body, do we not manifestly offer a path to atheism, both because extension is not created but has existed eternally, and because we have an idea of it without any relation to God, and so in some circumstances it would be possible for us to conceive of extension while supposing God not to exist?

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## ХИМИЯ

### отрывок на резюме

While the results with **P4** were promising, relatively high temperatures (100–120 °C) and catalyst loadings (1–3 mol %) were required for the reaction to reach completion. To design an improved catalyst system, we set out to qualitatively explore the reaction rate dependence on each substrate using reaction progress kinetic analysis (RPKA). As described by Blackmond, RPKA is a simple, systematic method to obtain a complete picture of a reaction's kinetic profile from a limited number of experiments performed under synthetically relevant conditions. This method has been successfully used in a number of laboratories to elucidate the reaction mechanism of various catalytic processes. The key parameter utilized in RPKA is “excess”, which refers to the difference between the initial concentrations of the two reactants (eq 1), and the kinetic information is obtained from reactions run under “different excess” conditions.

$$[\text{excess}] = [\text{amine}]_0 - [\text{aryl halide}]_0 \quad (1)$$

We chose the model reaction between aryl chloride **6** and amine **3** for our kinetic analysis using precatalyst **P4**. To broaden the study, we also explored the reaction with the corresponding aryl bromide **12**. The reactions were monitored in situ by reaction calorimetry along with GC analysis to support the calorimetry results. The reaction rate progress over time profiles for both aryl halides are shown together in Figure 2. It is immediately apparent that the shape of the curves is different for each aryl halide and that the reaction for ArBr is notably faster than that for ArCl. These observations suggest that the nature of the aryl halide plays a key role in the kinetics of the reaction. Following the RPKA method, the data may be replotted as rate vs [substrate] to determine the rate orders of each substrate.

Figure 3 shows the rate vs [ArCl] plot for the two different excess experiments shown in Figure 2 over the range of ArCl concentrations common to both reactions. At any given value of [ArCl], the concentration of amine is different for the two kinetic profiles, as illustrated by the dashed line (when [ArCl] = 0.3 M, [amine] = 0.8 and 0.3 M for the blue and red curves, respectively). An overlay of the curves at different amine concentrations indicates that the rate is independent of the concentration of amine for this range of concentrations. This behavior was unexpected given the steric encumbrance of **3**, which we initially predicted to bind to the Pd(II) center with difficulty and therefore be involved in the rate-determining step. However, the linear decay of the curves indicates that the reaction has a positive order in [ArCl] and that oxidative addition is (at least partially) rate-determining. The fact that the reactions reached different maximum rates when starting at different ArCl concentrations (Figure 2) provides additional evidence for a positive order in aryl halide (since the maximum rates do not differ by a factor of 2, the order in ArCl is fractional). The use of a ligand (**L4**) with phenyl groups as the phosphine substituents could explain the relatively slow rate of oxidative addition (computational evidence suggests that **L2** has a higher energy barrier than its alkyl analogue **L1** for this step).

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*Rational Ligand Design for the Arylation of Hindered Primary Amines Guided by Reaction Progress Kinetic Analysis*

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## отрывок на перевод

Organic molecules containing bulky alkyl groups have shown great potential in drug discovery and medicinal chemistry. Sterically demanding alkyl substituents such as adamantyl or *tert*-butyl are often introduced into pharmaceuticals to enhance lipophilicity and/or improve the drug's metabolic stability by shielding adjacent functional groups or reactive sites from enzymatic degradation. Aminoadamantanes themselves have been examined and used as antiviral drugs; however, aryl aminoadamantane derivatives and other anilines based on hindered amines such as **3–5** (Figure 1) remain largely unexplored, presumably due to difficulty in their preparation. Successful strategies that have previously been used to synthesize these bulky anilines employ an electrophilic amination approach. Amines **1** and **3** have been arylated through a titanium-mediated coupling of the corresponding *N*-chloroamines with Grignard reagents. Additionally, there are examples of transition-metal-free amination of arylboroxines and copper-catalyzed amination of organozinc reagents using **3**. Recently, Lalic reported an elegant synthesis of hindered tertiary anilines through the copper-catalyzed coupling of aryl boronic esters with *O*-benzoyl hydroxylamines. While these methods are efficient, the electrophilic amine must be separately prepared, and many of the nucleophiles that are employed are moisture-sensitive. A useful alternative is the palladium-catalyzed C–N cross-coupling—an operationally simple and widely used reaction in both industrial and academic settings. Although advances in ligand design have overcome many challenges, only a few examples of the *N*-arylation of hindered primary amines have been reported. Amines **1** and **2** have been previously cross-coupled with catalysts with either phosphines or *N*-heterocyclic carbenes as supporting ligands. However, most of these reactions require moderate catalyst loadings (1–5 mol %) and elevated temperatures (90–135 °C) and, most importantly, are limited with regard to the substrate scope. In addition, there are no examples using more hindered and challenging amine substrates such as **3–5**. The availability of a general method to obtain a broad range of hindered anilines by a Pd-catalyzed C–N cross-coupling process is desirable. Herein, we describe the development of two related catalyst systems that demonstrate high activity for the coupling of  $\alpha,\alpha,\alpha$ -trisubstituted primary amines **1–5** with a variety of (hetero)aryl halides.

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## отрывок на пересказ

Figure 7 shows the data from the different excess experiments for aryl chloride **6** as rate vs [ArCl] over the range of ArCl concentrations common to both reactions. Although the reaction has a more complex profile than with **P4**, the nonhorizontal shape of the curves and the different maximum rates (0.124 and 0.02 M/min for the blue and the red curves, respectively) imply that there is a positive order in aryl chloride and thus that oxidative addition remains, at least partially, the rate-determining step (the reaction has a fractional order in [ArCl]). In contrast to the ArCl reactions with **P4**, the two curves are not overlaid, which could indicate a positive reaction order in [amine] (the reactions have different rates at different amine concentrations). However, the convex shape of the rate curves (particularly explicit for the red curve) is typically

a hallmark of catalyst deactivation. The likelihood of rate dependence on [amine] vs catalyst deactivation can be deconvoluted with a quantitative assessment. We can consider relative rates of the two reactions at any given concentration of ArCl and amine, with “x” and “y” as the reaction orders in [ArCl] and [amine], respectively, and  $k_{\text{obs}}$  as the observed rate constant, which contains the catalyst concentration (eq 2). Choosing [ArCl] = 0.5 M, we see from Figure 7 that [amine] = 1.0 M for the blue curve (the beginning of the reaction) and 0.5 M for the reaction in red (50% conversion) and that their relative rates differ by a factor of 5 (eq 3). If  $k_{\text{obs}}$  is identical for the two runs, y is calculated to be greater than 2 (eq 4a), which is not mechanistically reasonable. If the reaction is in fact zeroth-order in [amine] ( $y = 0$ ), eq 4b indicates that  $k_{\text{obs}}$  for the red curve has been deactivated by a factor of 5 at 50% conversion. Although this mathematical argument cannot entirely exclude rate dependence on [amine], catalyst deactivation is a more likely explanation on the basis of the shape of the curves and the fact that different maximum rates are obtained for different ArCl concentrations.

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## ЮРИСПРУДЕНЦИЯ

### отрывок на резюме

#### **Constitutional Law and Positive Rights**

A third important specific issue is the role of constitutional law versus ordinary law/politics in the bestowing of entitlements from the state. To what extent is and should constitutional law be confined to imposing duties of forbearance on (mostly) government action as contrasted with imposing affirmative obligations or duties of action?

In other words, should there be constitutional entitlements or only political ones?

Modern constitutional law around the world contains two main types of such entitlements, or positive rights. The first is social and economic rights as, for example, the rights to education, health care, housing, social security, and work. The second is protective rights, the right to protection or security from the state against certain types of action by fellow-citizens, such as violence and theft. Constitutions may and do contain both types of positive rights, one type but not the other, or neither.

As ‘second generation’ rights, social and economic constitutional rights are primarily the product of one of the two great modern bursts of constitution-making, the first after 1945 and the second after 1989. The 1947 Italian and the 1996 South African Constitutions are perhaps paradigmatic in this regard. At the same time, however, overall the constitutions of the newly liberated countries of Central and Eastern Europe and South Africa, as well as those of developing nations, more consistently contain significant numbers of social and economic rights than either West European countries or common law jurisdictions.

Whereas where granted, social and economic rights are typically expressly contained in a constitutional text, constitutional rights to protection are a little more evenly divided between

text and judicial implication. So, for example, the constitutions of South Africa, Greece, Switzerland, and Ireland contain express rights to state protection. Elsewhere, protective duties have been implied by the judiciary from certain textual rights that seem on their face negative. Thus, the best known and most important protective duties (Schutzpflichten) in Germany concern the right to life and freedom of expression. The FCC famously interpreted the former in the First Abortion Case to require the state to protect the lives of fetuses against such private actors as their mothers, presumptively through the criminal law. The right to freedom of broadcasting was also interpreted by the FCC to require state regulation to ensure the protection of citizens' access to the full range of political opinions necessary for them to make informed decisions at elections. Although admittedly an international court, the European Court of Human Rights has been particularly active in inferring protective duties—though not social and economic rights—from the seemingly negatively phrased civil and political rights contained in the European Convention. Unlike the case generally with negative constitutional rights, the practical impact of both types of positive constitutional rights is sometimes significantly reduced either by express statements that some or all such rights are not judicially enforceable or by judicial practice to similar effect.

*(From The Oxford Handbook of Comparative Constitutional Law*

*Edited by Michel Rosenfeld and András Sajó*

*Print Publication Date: May 2012, Oxford University Press; Subject: Law*

*The Place Of Constitutional Law in the Legal System by Stephen Gardbaum, MacArthur Foundation Professor of International Justice and Human Rights, UCLA School of Law, California, USA)*

#### **отрывок на перевод**

### **General Views on the Place of Constitutional Law**

Taking this expanded, less formal conception of constitutional law into account, and looking comparatively at the theory and practice of constitutionalism in various particular contexts, there are currently three competing general accounts of the place of constitutional law in a legal system. These three accounts form a spectrum running from a non-existent to a comprehensive role for constitutional law.

The first position has come to be known as 'political constitutionalism' in the United Kingdom, where it has become a well-theorized and articulated response to the perceived trend towards its opposite, 'legal constitutionalism', in recent years. The position itself, however, is a familiar one elsewhere, although increasingly more in theory than practice. In response to the general question of what type or number of moral/political/legal issues and conflicts in society should be resolved by constitutional law in either the big-c or newer, more comprehensive sense, the answer of political constitutionalism is essentially zero. All such conflicts should be resolved politically, through ordinary, non-constitutional laws made and executed by political actors who remain fully accountable for them to the electorate. More specifically, the constraints on legislatures in particular should be political and not judicially administered ones, with office holders held to account through political processes and in political institutions rather than legal ones. Similarly, according to political constitutionalists, removing rights from democratic politics, as legal constitutionalism typically does, is both an ineffective and illegitimate method of upholding and protecting them. Although aiming to secure constitutionalism's traditional negative function of limiting political power, albeit by exclusively political rather than legal means, political constitutionalism also aspires to provide space for the more positive function of promoting constitutionalist values, such as individual autonomy and equal concern and respect.

As a normative theory with strong roots in republican conceptions of democracy, political constitutionalism is to be distinguished from empirical theories concerning the phenomena of formal constitutions and constitutional law that exist on paper but do not in fact determine any of the issues they purport to.

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### **отрывок на пересказ**

#### **The Place of Constitutional Law in Specific Parts of the Legal System**

The previous section discussed what might be thought of as macro-constitutionalism, differing views on the place of constitutional law in general. Is there a place for it at all and, if so, what should its general scope be compared to ordinary law and political accountability? In this section, I turn to micro-constitutionalism. What is and should be the role of constitutional law versus ordinary law and the political process that makes and executes it in certain specific and contested areas? In particular, those to be discussed are (1) rights protection and the structure of government; (2) private law and the conduct of private individuals; and (3) entitlements to state protection and socio-economic benefits.

Of course, the answers to these more micro or specific issues are relevant to, and in some cases determined by, the broader brushes of the macro positions discussed in the previous section. Thus, political constitutionalism's macro-no, as it were, implies negative answers to all three more micro-issues, and total constitutionalism's macro-yes the opposite. Indeed, it is the expansive answers given in precisely these three areas that underlie this interpretation of German constitutional practice. So in this sense, the debate here is conducted exclusively within the terrain of legal constitutionalism as a major part of the boundary issues determining the precise scope of constitutional law versus politics, the line between the 'some' issues to be decided by one and the other.

Nonetheless, most of the scholarship on these three issues has been conducted at the micro-level, in that it has treated the three topics in a relatively self-contained and autonomous manner rather than as mostly implications of a general macro-constitutionalist position.

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