

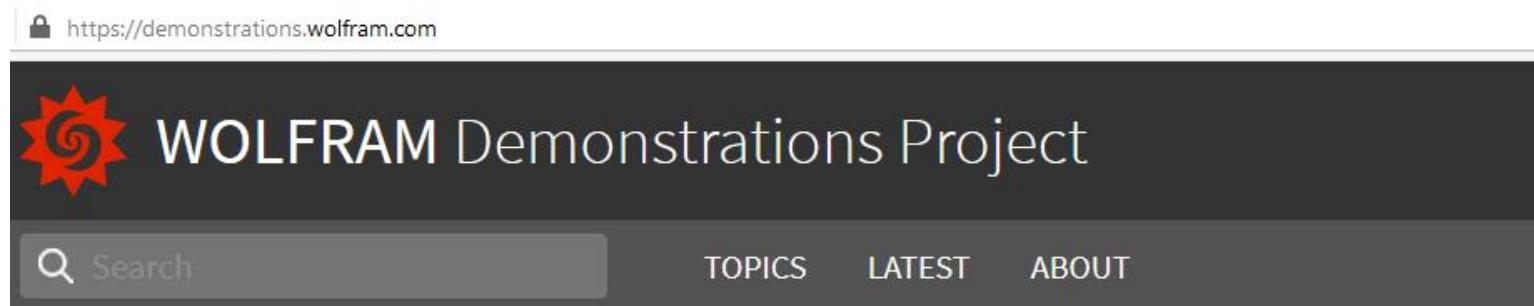
Технологии Wolfram

Интерактивные демонстрации

Использование готовых моделей

1) Перейти на сайт

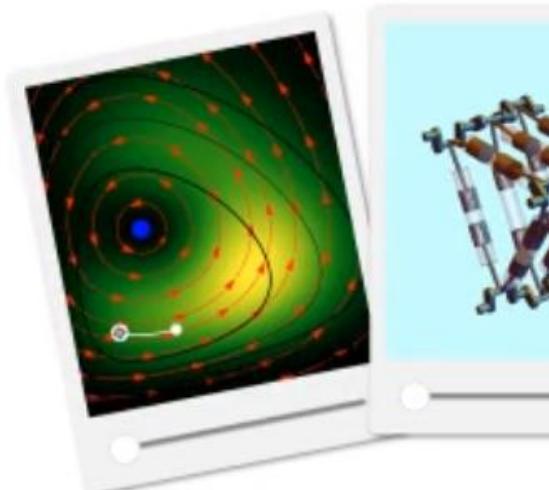
<https://demonstrations.wolfram.com/>



Bringing Ideas to Life

12,000+ Interactive Wolfram Notebooks for
education, research, recreation and more

Selected and curated by Wolfram Research



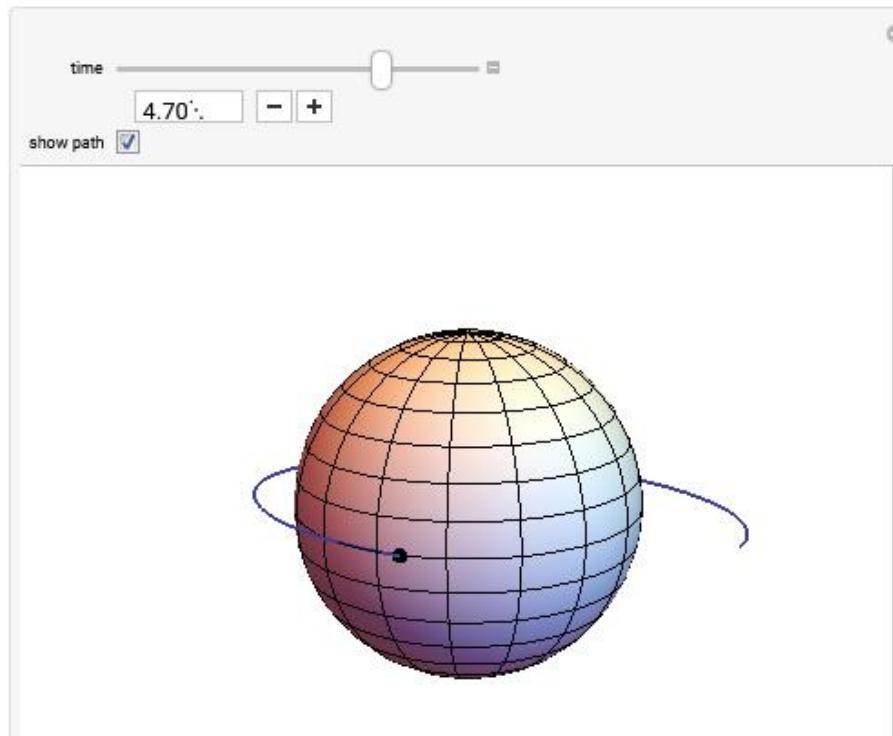
2) Ознакомиться с примером демонстрации движения спутника по орбите

<https://demonstrations.wolfram.com/Sputnik1OrbitingTheEarth/>

Для повтора можно обновить страницу

Sputnik 1 Orbiting the Earth

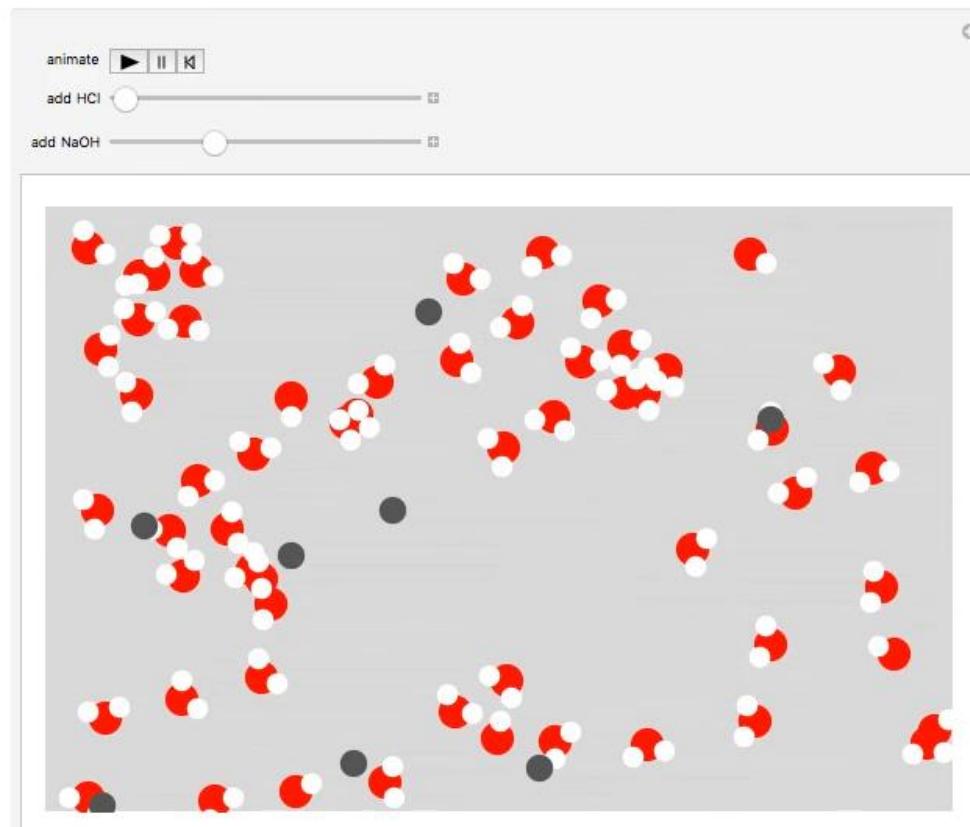
BETA



3) Ознакомиться с примером, демонстрирующим структуру воды в разных средах

<https://demonstrations.wolfram.com/StructureOfWaterInAcidAndBasicMedia/>

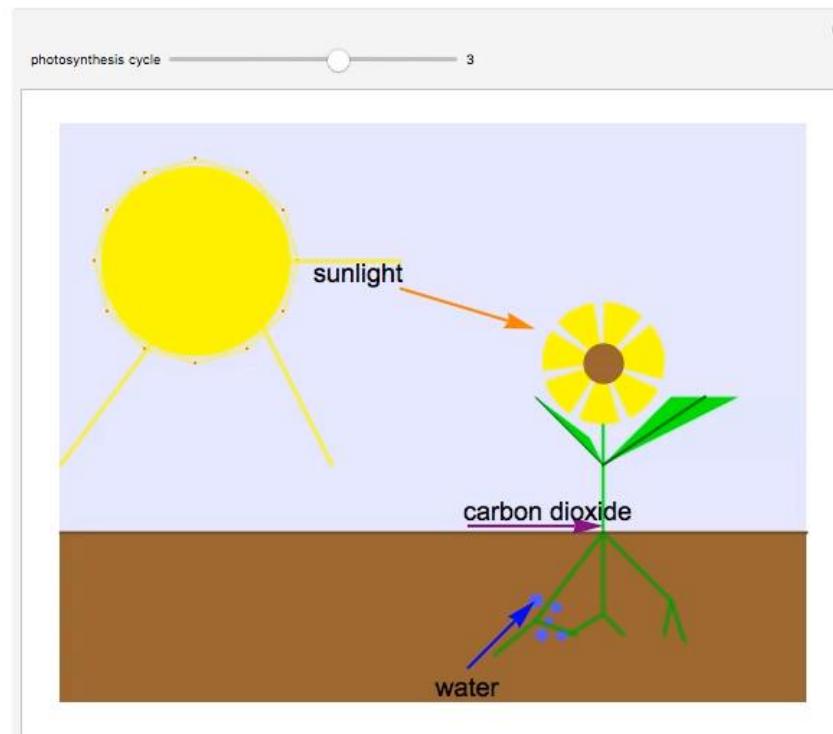
Structure of Water in Acid and Basic Media



4) Ознакомиться с примером, демонстрирующим фотосинтез

<https://demonstrations.wolfram.com/Photosynthesis/>

Photosynthesis



5) Ознакомиться с примером демонстрации прохождения луча через линзу

<https://demonstrations.wolfram.com/RayTracingWithLenses/>

Ray Tracing With Lenses

BETA

focal length: -0.85

lens type: converging (selected) diverging

object size: 0.6

object position: -2

parallel from top:

parallel from bottom:

through focal point from top:

through focal point from bottom:

rays through lens center:

show perceived image:

A diagram illustrating ray tracing through a converging lens. A vertical arrow representing an object is positioned to the left of a lens. Several colored rays originate from different points on the object and pass through the lens. The rays converge to form a real image, which is also represented by a vertical arrow. Dashed lines indicate the path of the rays before they enter the lens.

6) Перейти к разделу BROWSE TOPICS

demotions.wolfram.com

BROWSE TOPICS

 Mathematics Algebra Calculus & Analysis ...	 Business & Social Systems Economics Finance	 Creative Arts Art Architecture Music ...
 Computation Algorithms Computer Science ...	 Systems, Models & Methods Discrete Models Networks ...	 Kids & Fun For Kids Puzzles Optical Illusions
 Physical Sciences Physics Earth Science ...	 Engineering & Technology Machines Electrical Engineering ...	 Programming Functionality Short Programs 3D Graphics ...
 Life Sciences Biology ...	 Our World Everyday Life Geography ...	 US Common Core State Educational Standards

FEATURED DEMONSTRATIONS

A 3D surface plot of a torus with a color gradient from blue to red. The plot has several sliders on the left for parameters like 'size of rotation' and 'shape parameters'.

A fractal pattern generator showing a complex, colorful fractal structure. It has sliders for 'size' and 'color'.

A geometric demonstration showing a symmetric initial triangle with various points and lines. It includes sliders for 'iterations', 'dividers', and 'masses'.

An abstract fractal image featuring a colorful, swirling pattern. It has sliders for 'size' and 'color'.

An abstract fractal image featuring a colorful, swirling pattern. It has sliders for 'size' and 'color'.

[View](#)

7) Можно выбрать свой предмет

Mathematics

[Algebra](#) | [Calculus & Analysis](#) | [School Mathematics](#) ...

Computation

[Algorithms](#) | [Computer Science](#) | [NKS / Wolfram Science](#) ...

Physical Sciences

[Physics](#) | [Earth Science](#) | [Astronomy](#) ...

[Astronomy](#)

[Chemistry](#)

[Earth Science](#)

[History of Science](#)

[Materials Science](#)

- Physics

[High School Physics](#) »

[Acoustics](#) »

[Astrophysics](#) »

[College Physics](#) »

[Electromagnetism](#)

[Fluid Mechanics](#) »

8) Модели для демонстрации на уроках или внеклассных мероприятиях

MECHANICS

DEMONSTRATIONS

Demonstrations 1 - 20 of 635

 [Subscribe to RSS feed](#)

[1](#) | [2](#) | [3](#) | [4](#) ... [32](#) | [NEXT »](#)



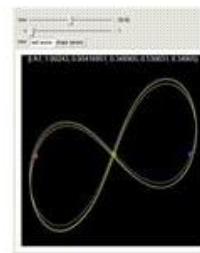
Periodic Planar
Collisionless Three-
Body Orbits with
Unequal Masses

New this week



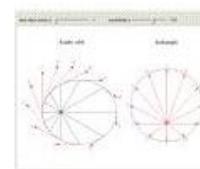
Collisionless Periodic
Orbits in the Free-Fall
Three-Body Problem

New this week



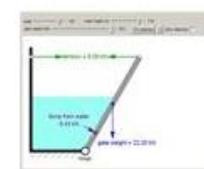
Families of Newtonian
Periodic Planar Three-
Body Orbits

New this week

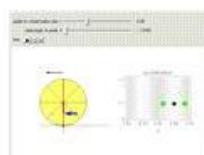


Hodographs for Kepler
Orbits

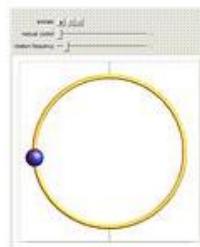
New this month



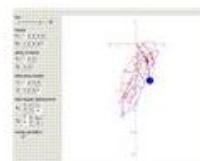
Forces on a Partially
Submerged Gate



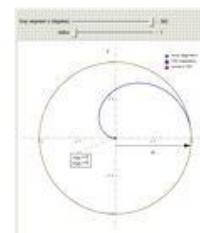
The Bicycle Paradox



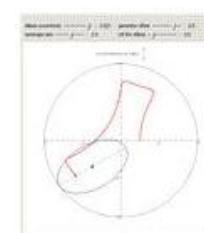
Bead on a Rotating
Wire



Double-Spring
Pendulum



Center of Mass of a
Circular Arc



Ellipse Rolling inside a
Circle

9) Перейти к разделу FEATURED DEMONSTRATIONS, ознакомиться с примерами

demonstrations.wolfram.com

FEATURED DEMONSTRATIONS

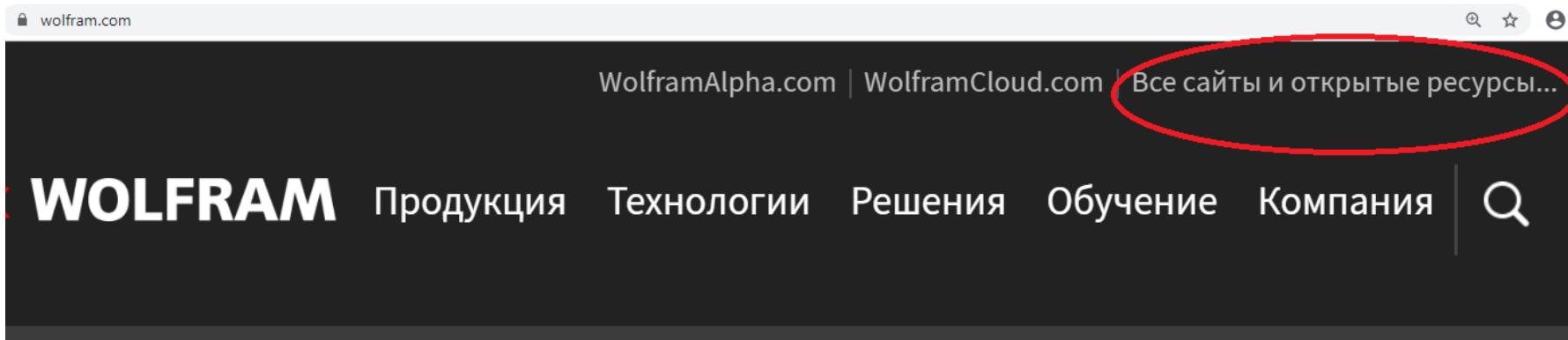
View Latest

The screenshot displays a grid of 12 Wolfram Demonstrations, each with its own interface and visualization:

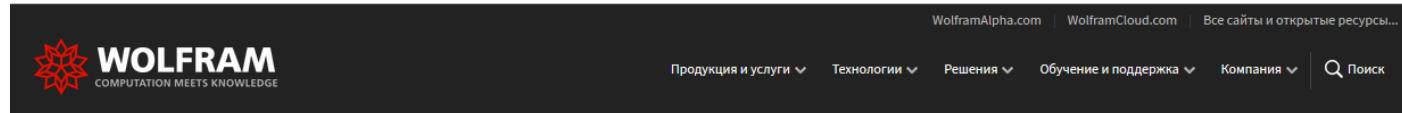
- Top-left: A 3D torus with a color gradient.
- Top-middle: A 2D grid pattern with a repeating geometric motif.
- Top-right: A 3D geometric model of a polyhedron with multiple faces and colors.
- Middle-left: A 3D model of a complex wireframe structure with colored segments.
- Middle-middle: A 3D sphere with a grid overlay.
- Middle-right: A 3D model of a spring-mass system on a surface.
- Bottom-left: A 2D star-shaped polygon with a color gradient.
- Bottom-middle: A 3D model of a table with a circular top supported by a curved base.
- Bottom-right: A 2D heatmap with a central peak and boundary conditions.

Создание моделей в WOLFRAM CLOUD

1) Перейти на сайт <https://www.wolfram.com/>
→ Все сайты и открытые ресурсы



2) Перейти на Wolfram Language Sandbox



ОТКРЫТЫЕ РЕСУРСЫ

[Обратная связь](#)

Ставя перед собой задачу максимально широкого донесения до пользователей перспектив машинных вычислений и знаний, компания Wolfram много лет занимается созданием первоклассных ресурсов, посвященных вычислениям и знаниям, которые находятся в открытом пользовании, уделяя особое внимание образованию на всех уровнях.



[Wolfram|Alpha](#)

Ведущая вопросно-ответная информационно-вычислительная система компании Wolfram, свободно доступная в Интернете, предоставляющая каждому пользователю доступ к вычислительным алгоритмам и фактическим знаниям на экспертном уровне.

[Wolfram|Alpha Pro](#)

Мобильные приложения для Wolfram|Alpha
Линейка инструментов для Wolfram|Alpha
Wolfram генератор упражнений
Вся продукция и услуги Wolfram|Alpha ...



[Домашняя страница языка Wolfram Language](#)

Все о языке Wolfram Language, в том числе вопросы-ответы и галерея программных реализаций проектов.



[Справочник по функциям языка Wolfram Language](#)

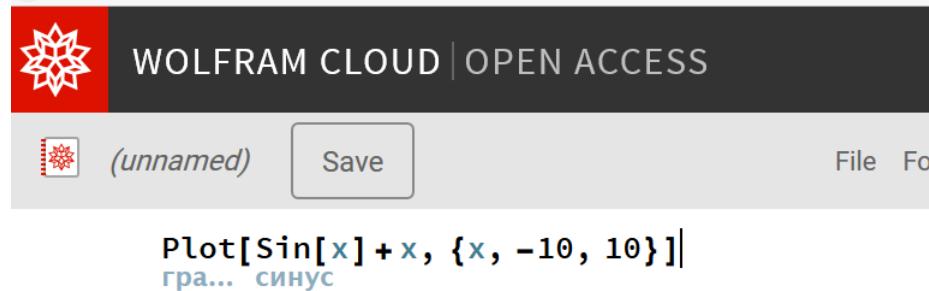
Искрещивающее описание языка Wolfram Language, содержащее более 11 тысяч страниц и 100 тысяч примеров.



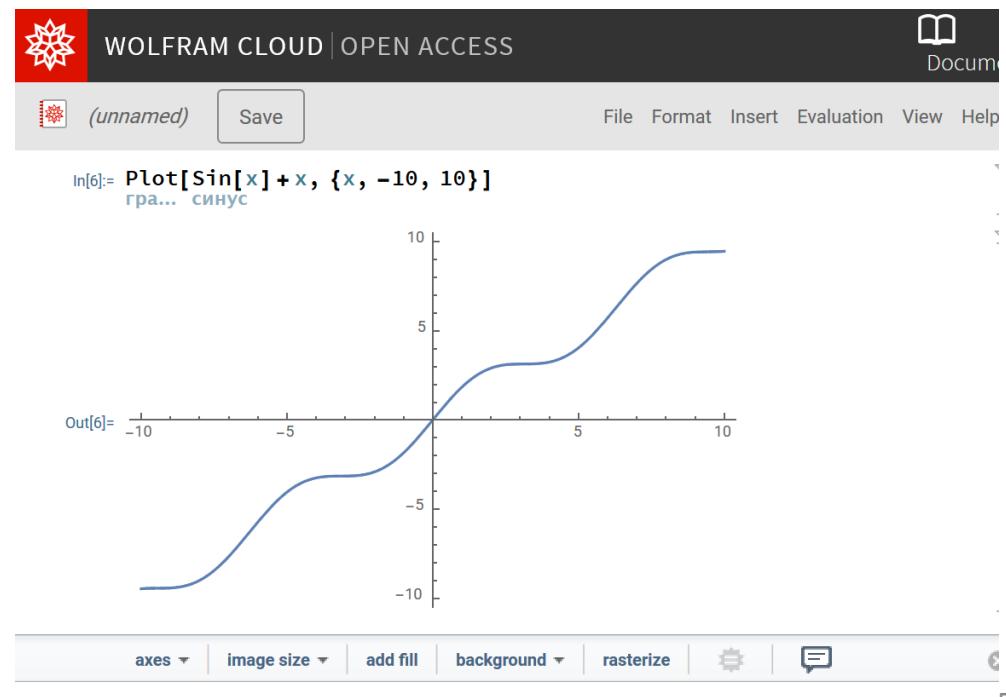
[Wolfram Language Sandbox](#)

Начните писать свой собственный код на языке Wolfram Language (регистрация не требуется).

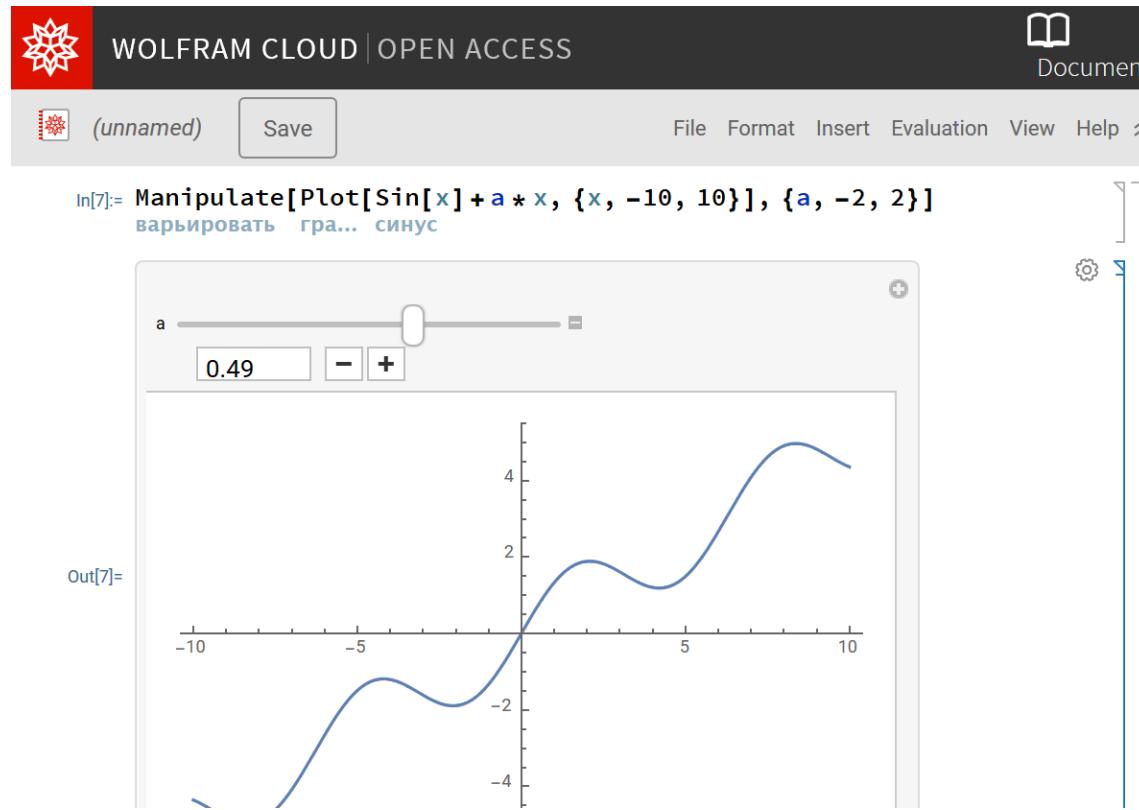
3) В появившемся окне набрать
`Plot[Sin[x]+x,{x,-10,10}]`



Нажать Shift+Enter



4) Изменить код. Набрать
Manipulate[Plot[Sin[x]+a*x,{x,-10,10}],{a,-2,2}]
И нажать Shift+Enter



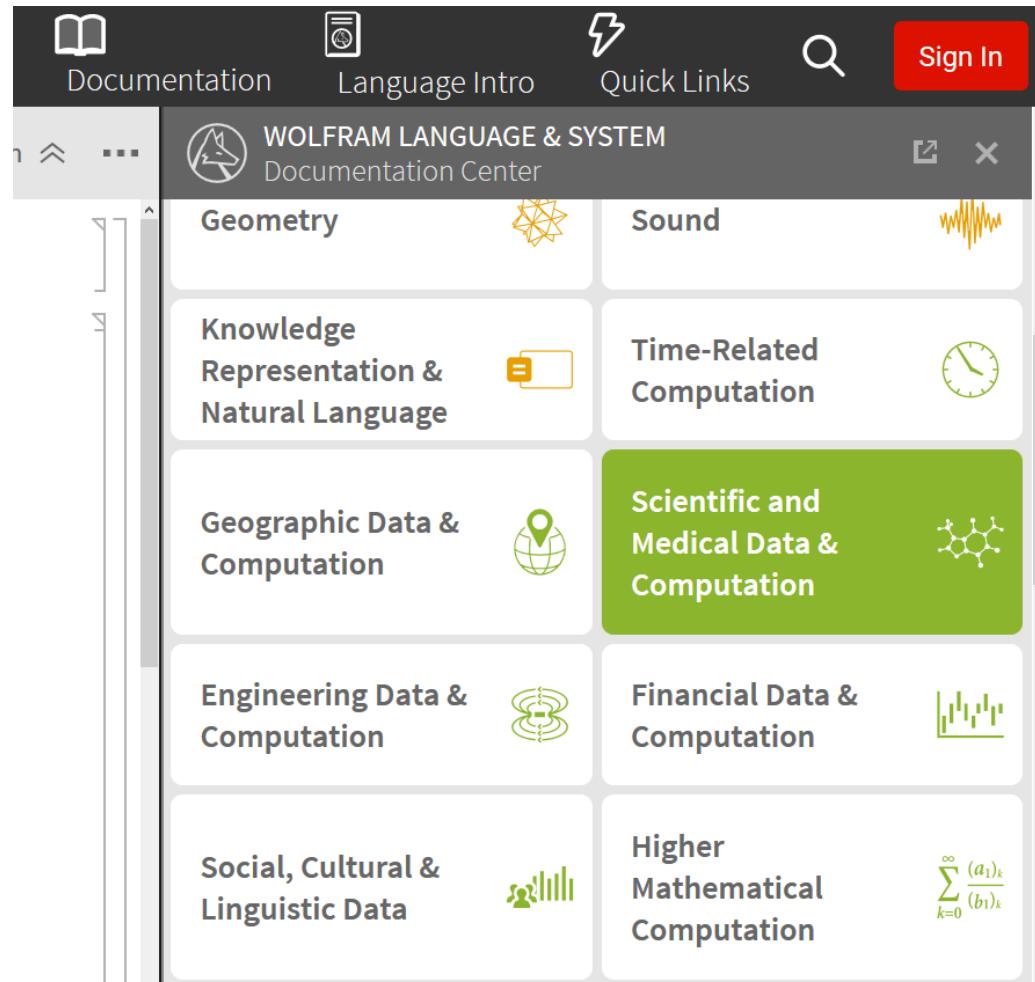
Изменить значение а, используя ползунок
(слайдер). Посмотреть за изменением графика

5)Перейти на Documentation (это справочная система)

The screenshot shows the Wolfram Cloud interface. On the left, there is a code input field with the command `In[7]:= Manipulate[Plot[Sin[x] + a * x, {x, -10, 10}], {a, -2, 2}]`. Below it, the output `Out[7]=` shows a plot of the function $\sin(x) + a \cdot x$ for $x \in [-10, 10]$ and $a \in [-2, 2]$. A slider for the parameter a is set to 0.49. The plot shows a periodic wave that is shifted and scaled by the value of a . On the right side of the interface, there is a sidebar titled "WOLFRAM LANGUAGE & SYSTEM Documentation Center". At the top of this sidebar, there are several buttons: "Documentation" (which is circled in red), "Language Intro", "Quick Links", and a search icon. Below the sidebar, there are nine categories of documentation, each with a title, a small icon, and a URL-like string:

Category	Icon	URL
Core Language & Structure	f[x]	Wolfram Language
Data Manipulation & Analysis	bar chart	Data & Computation
Visualization & Graphics	3D surface	Visualizations
Machine Learning	neuron network	Machine Learning
Symbolic & Numeric Computation	x^2+y	Mathematical Computation
Strings & Text	Wolfram Language	Text Processing
Graphs & Networks	triangle with arrows	Graphs & Networks
Images	camera icon	Image Processing
Geometry	star icon	Geometry
Sound	waveform icon	Sound

6) Выбрать Scientific and Medical Data & Computation



7) Выбрать Life Science & Medicine

The screenshot shows the Wolfram Language & System Documentation Center interface. At the top, there are links for Documentation, Language Intro, Quick Links, and a Sign In button. Below the header, a navigation bar includes 'WOLFRAM LANGUAGE & SYSTEM Documentation Center'. The main content area is divided into several sections: 'Geographic Data & Computation' (with a globe icon), 'Scientific and Medical Data & Computation' (highlighted with a green background and a molecular structure icon), 'Physics & Chemistry >>', 'Astronomical Science >>', 'Earth Sciences >>', and 'Life Sciences & Medicine >>'. Other sections include 'Molecular Structure & Computation >>', 'Scientific Models >>', 'Computational Systems & NKS >>', 'Scientific Data Analysis >>', 'Units & Measures >>', and 'Connected Devices >>'.

The screenshot shows the 'WOLFRAM LANGUAGE & SYSTEM Documentation Center' page for 'Life Sciences & Medicine: Data & Computation'. The title is prominently displayed. Below the title, a text block states: 'The Wolfram Language provides immediate access to extensive life science data, as well as providing powerful tools for bioinformatics and biostatistics.' A code snippet is shown: `Entity[]` — request data using free-form linguistics. Below this, a definition for `EntityValue` is provided: 'general access to values of properties for all types of entities'. A list of related entities follows: Entity, EntityClass, EntityList, RandomEntity, EntityFunction, and an ellipsis (...).

8) «Прокрутить»
вниз, найти
AnatomyPlot3D

The screenshot shows the Wolfram Language & System Documentation Center interface. At the top, there are navigation links: Documentation, Language Intro, Quick Links, and a Sign In button. Below the header, the title "WOLFRAM LANGUAGE & SYSTEM Documentation Center" is displayed next to a logo of a horse's head. The main content area is titled "Anatomical Data". It includes a box for "AnatomicalStructure" (described as nearly 100,000 human anatomical structures), two buttons for "AnatomicalFunctionalConcept" and "AnatomicalTemporalConcept", and a section titled "Anatomical Visualization" which lists "AnatomyPlot3D" (visualization of anatomical structures), "AnatomyStyling", "AnatomySkinStyle", and "ClipPlanes". Further down, there is a section titled "Medical Computation" with links to "HumanGrowthData" (human growth curves and related data), "FetalGrowthData" (properties of fetal growth), and "MortalityData" (detailed mortality data for many countries).

9) Скопировать выделенную строчку и вставить в поле левого окна, нажать Shift+Enter

The screenshot shows the Wolfram Language & System Documentation Center. The main title is "AnatomyPlot3D". Below it, the text reads: "AnatomyPlot3D [primitives, options] represents a three-dimensional graphical image that works with anatomical entities as well as standard 3D graphics primitives and directives." There is a section titled "Details and Options" with several bullet points and a table of options. Below that is a "Examples" section with a "Basic Examples" subsection. A red oval highlights the first example: "1» AnatomyPlot3D[left femur ANATOMICAL STRUCTURE]". To the right of the code is a 3D rendering of a human femur bone.

AnatomyPlot3D[Entity["AnatomicalStructure",
"LeftFemur"]]

10) Получившуюся трёхмерную модель можно поворачивать, «зацепив» мышкой

WOLFRAM CLOUD | OPEN ACCESS

(unnamed) Save

File Format Evaluation ⚙

In[9]:= `AnatomyPlot3D[Entity["AnatomicalStructure", "LeftFemur"]]`
Анатомический ... сущность

Out[9]=



BUILT-IN SYMBOL

AnatomyPlot3D

AnatomyPlot3D [*primitives*, *options*]

represents a three-dimensional graphical image that works with *anatomical entities* as *graphics primitives* and *directives*.

Details and Options

Using `AnatomyPlot3D` requires internal connectivity.

- `AnatomyPlot3D` allows *annotation primitives* to represent annotated 3D primitives, substituting the “`Graphical3D`” property of the entity.
- Entities that appear inside of primitives act as coordinate specifiers, substituting the “`RegionCentroid`” of the entity.
- `AnatomyPlot3D` uses `EntityValue` as a graphical image.
- `Meshing` can be applied to anatomical entities, substituting the “`RegionMesh`” of the entity.
- Coordinate values of human and animal anatomical entities correspond to an average adult human male and average adult animal, respectively, measured in millimeters.
- `AnatomyPlot3D` uses the same directives as `Graphics3D`, with the following addition:

→	Entity	whether to draw the bounding box
→	Lighting	unlocked light sources to use
→	Performance	overall theme for the plot
→	Antialiasing	whether to automatically include smooth skin surfaces
→	ViewPoint	viewing position

AnatomyPlot3D has the same options as `Graphics3D`, with the following additions:

→	Base	“False”	whether to draw the bounding box
→	Lighting	“Neutral”	unlocked light sources to use
→	Performance	“None”	overall theme for the plot
→	Antialiasing	“Automatic”	whether to automatically include smooth skin surfaces
→	ViewPoint	-18.0	viewing position

AnatomyPlot3D includes:

- “Business”
- “Modern”

Examples

open all

Basic Examples (5)

Display basic entities:

In[1]:= `AnatomyPlot3D["left femur"]`

11) Изучить другие примеры этого раздела, скопировать их в левое окно, посмотреть результат

WOLFRAM LANGUAGE & SYSTEM Documentation Center Quick Links Sign In

Coloring and styling of entities:

```
In[1]:= AnatomyPlot3D[{ left clavicle ANATOMICAL STRUCTURE , Red, left scapula ANATOMICAL STRUCTURE }]
```

Out[1]=



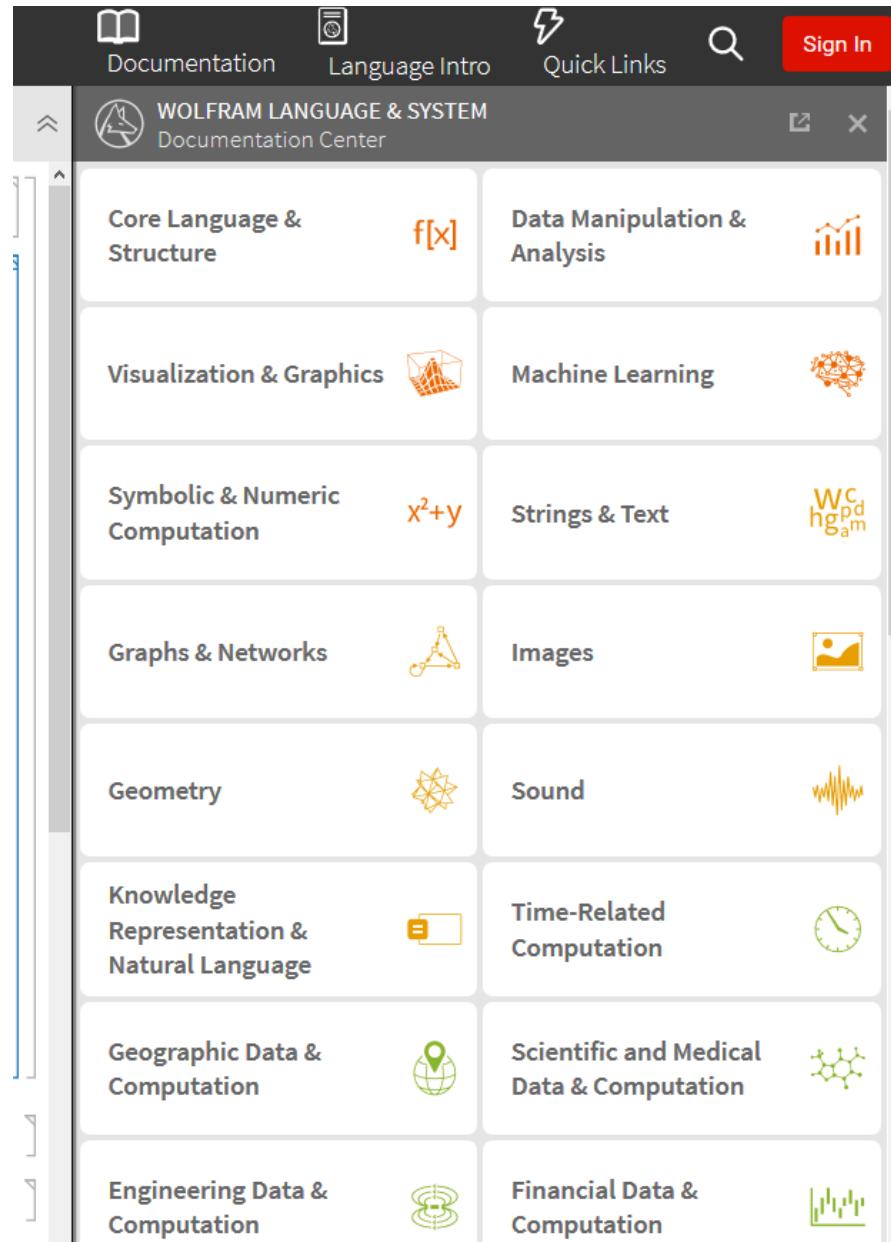
Use a theme for stylized effects:

```
In[1]:= AnatomyPlot3D[{ right hand ANATOMICAL STRUCTURE }, PlotTheme → "Business"]
```

Out[1]=



12) Вернуться к Documentation.
Выбрать раздел, наиболее близкий к Вашему предмету



13) Например,
Visualization&Graphics



Function Visualization

The screenshot shows the Wolfram Language & System Documentation Center interface. At the top, there are links for Documentation, Language Intro, Quick Links, and Sign In. Below the header, the title "WOLFRAM LANGUAGE & SYSTEM Documentation Center" is displayed, along with a logo of a horse.

The main content area is organized into several categories:

- Core Language & Structure** (f[x])
- Data Manipulation & Analysis** (chart icon)
- Visualization & Graphics** (highlighted in orange, featuring a 3D surface plot icon)
- Machine Learning** (cogwheel icon)

Below these, a large orange box highlights the **Visualization & Graphics** category and its sub-sections:

- Data Visualization** » **Function Visualization** »
- Charts & Information Visualization** »
- Geographic Visualization** » **Dynamic Visualization** »

Further down, other sub-sections are listed:

- Options & Styling** » **Interactivity & Drawing** »
- Symbolic Graphics Language** » **Importing & Exporting** »

The bottom half of the page contains more categories in a grid format:

Symbolic & Numeric Computation (x^2+y)	Strings & Text (W_{hg}^{pd})
Graphs & Networks (triangle icon)	Images (camera icon)
Geometry (star icon)	Sound (soundwave icon)
Knowledge Representation & (book icon)	Time-Related Computation (clock icon)

14) Например, функция (команда) Plot3D. Сначала идёт описание функции, потом примеры. Перейти к Basic Examples, скопировать код и перенести в левое окно

WOLFRAM LANGUAGE & SYSTEM Documentation Center

Plot3D

`Plot3D [f , { x , x_{min} , x_{max} }, { y , y_{min} , y_{max} }]`
generates a three-dimensional plot of f as a function of x and y .

`Plot3D [{ f_1 , f_2 , ...}, { x , x_{min} , x_{max} }, { y , y_{min} , y_{max} }]`
plots several functions.

`Plot3D [..., $w[f_i]$, ...], ...]`
plots f_i with features defined by the symbolic wrapper w .

`Plot3D [..., { x , y } \in reg]`
takes variables $\{x, y\}$ to be in the geometric region reg .

Details and Options

Notes are left at any position where the ; is available to `None` or anything other than real numbers.

- `Plot3D` creates the variables x and y in local, effectively using `Block`.
- `Plot3D` has attribute `HoldAll` and evaluates f only after assigning specific numerical values to x and y .
- It is sometimes more efficient to use `Plot3D` to evaluate f symbolically before specific numerical values are assigned.
- The following `RegionFunction` can be used for z :
 - `Plot3D[...]` uses `RegionFunction[z]` to provide an annotation for z .
 - `Plot3D[...]` evaluates z when the curve for z is chosen.
 - `Plot3D[...]` labels the function with a default place the value at a relative position p you define argument `value` for `Label`.
 - `Plot3D[...]` defines `value` for `Label`.
 - `Plot3D[...]` defines `value` for `Label`.

make the function untaggable
label the function
place the label at relative position p
identify this function as a legend
display the function in a style
display in the static area on mouseover
show the function using the specified style
which is useful to fine tune
use `Function` as `Label`

Provide an annotation for z
evaluate z when the curve for z is chosen
label the function with a default place the value at a relative position p you define argument `value` for `Label`

Wrappers w can be applied at multiple levels
 \rightarrow \rightarrow \rightarrow
 \rightarrow \rightarrow \rightarrow

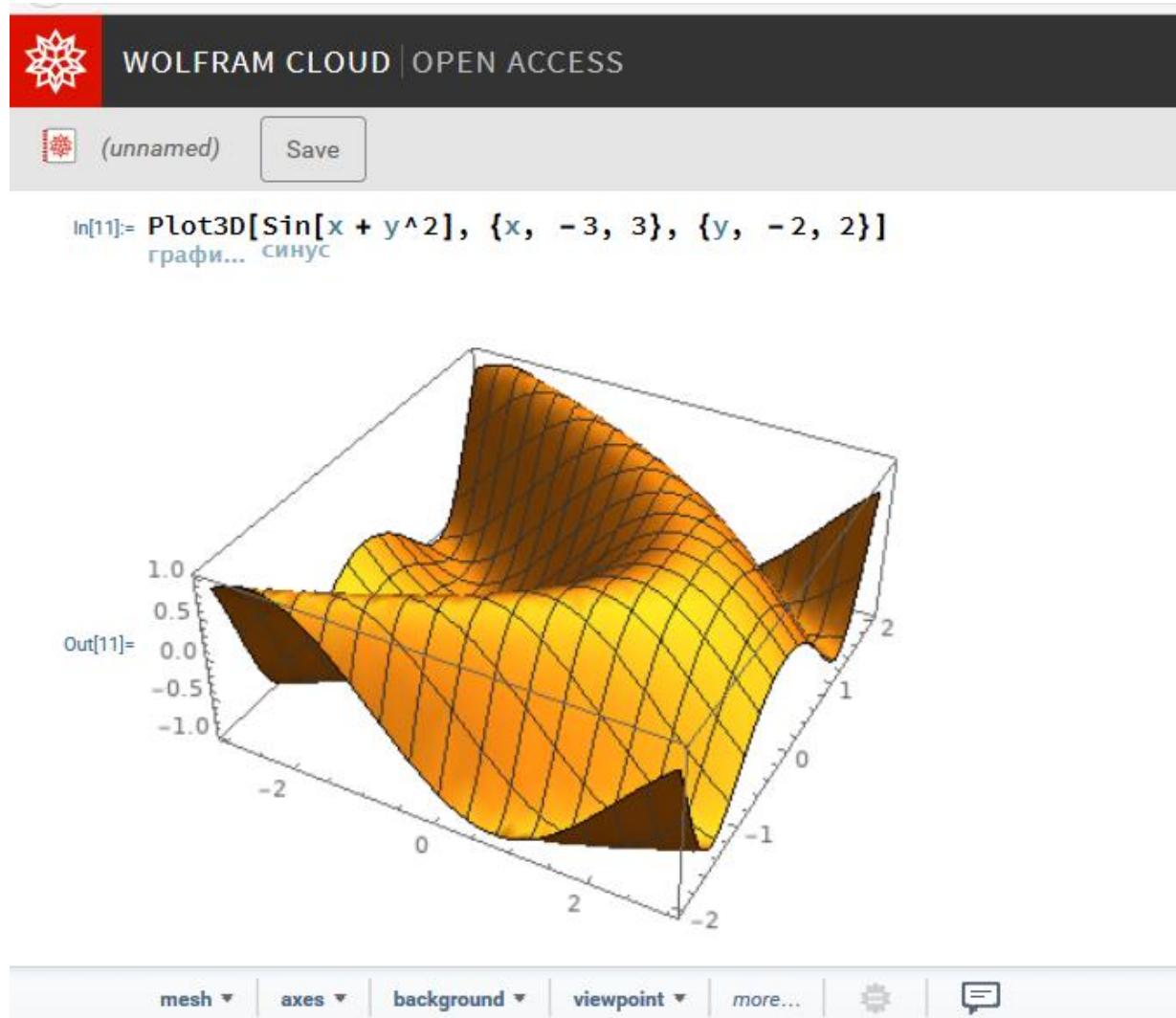
Examples open all

Basic Examples (4)

Plot a function:

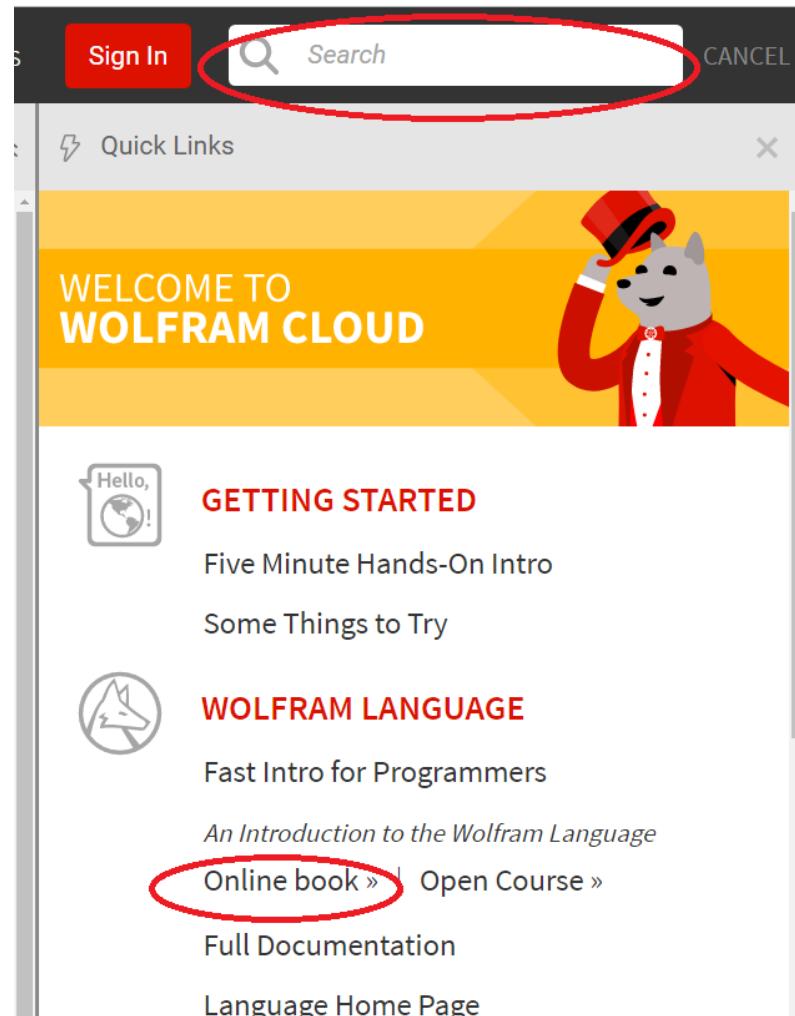
1) `Plot3D[Sin[x + y^2], {x, -3, 3}, {y, -2, 2}]`

15) Полученную поверхность тоже можно рассматривать с разных точек



16) Найти по своему или близкому к Вашему предмету 3 функции (команды) и проверить их (некоторые примеры могут не сработать на сайте).

Можно воспользоваться поиском (предварительно перевести на английский язык) или онлайн книгой



По каждой команде приведены:

Описание
функции

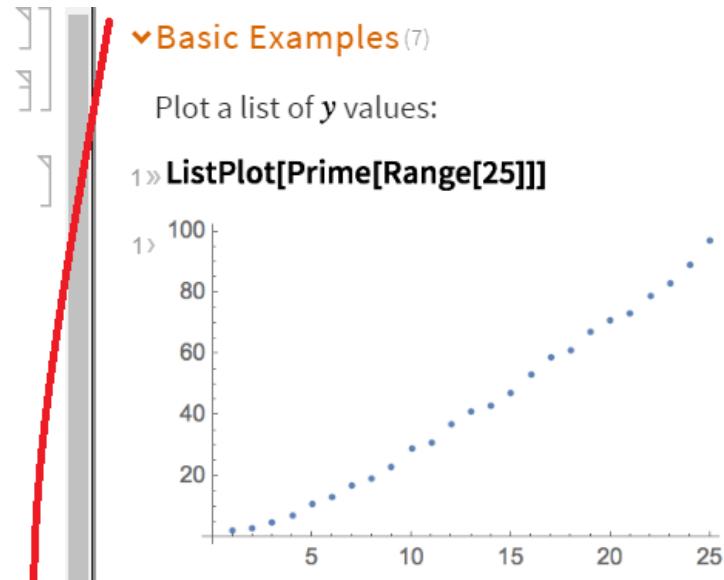
Детали
и опции

The screenshot shows the Wolfram Language documentation for the `ListPlot` function. The page has a light blue header with the title `ListPlot`. Below the header, there are four main sections separated by horizontal lines:

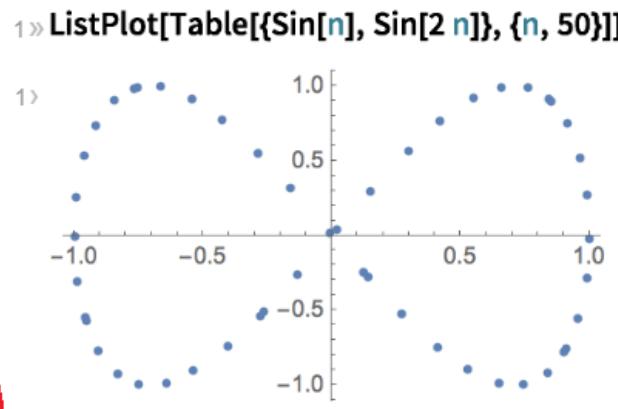
- `ListPlot [{y1, y2, ...}]`**
plots points {1, y₁}, {2, y₂}, ...
- `ListPlot [{ {x1, y1}, {x2, y2}, ...}]`**
plots a list of points with specified x and y coordinates
- `ListPlot [{ data1, data2, ...}]`**
plots data from all the $data_i$.
- `ListPlot [{..., w[datai, ...], ...}]`**
plots $data_i$ with features defined by the symbolic wrapper w .

Below these sections is a large orange button labeled **> Details and Options**. To the right of the button, there is a sidebar with several small blue links under the heading "Details, Examples". At the bottom of the page is a blue button labeled **▼ Examples** and a white button labeled **open all**.

Примеры



Plot a list of x, y pairs:





Дополнительные
возможности,
применение и т. д.

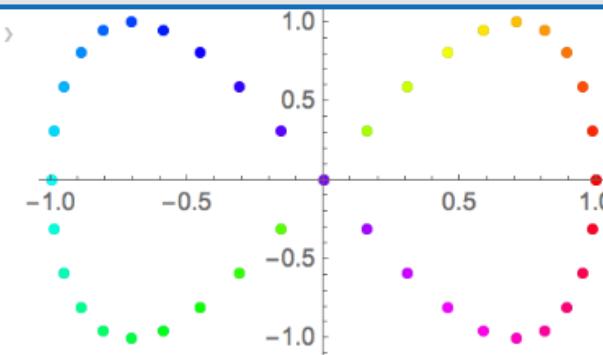
ListPlot

See Also ▾

Related Guides ▾

...

<



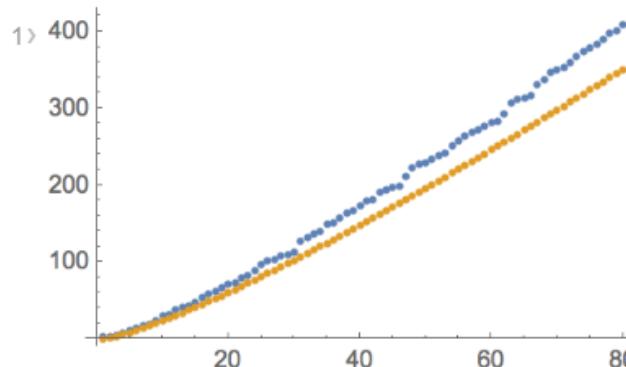
› Scope (52)

› Options (121)

▼ Applications (9)

Compare the n^{th} prime to an estimate:

1 » `ListPlot[{Table[Prime[n], {n, 80}], Table[n Log[n], {n, 80}]}]`



Все пояснения сопровождаются примерами,
их можно выполнить