

# The Khipu Handbook

This documentation was converted from the KDE UserBase  
Khipu/Manual page.



# The Khipu Handbook

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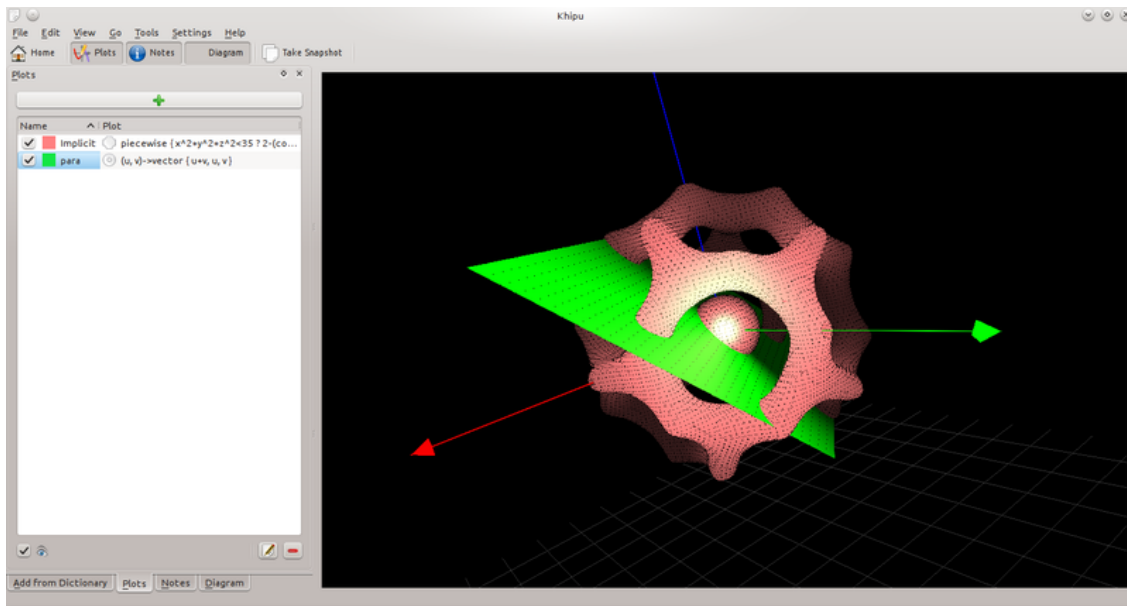
## Abstract

# Chapter 1

## Khipu Plotting is Just a Fun

Khipu is an advanced mathematical function plotter application.

It is part of the [KDE Education Project](#) and a replacement of an earlier function plotting application KmPlot.



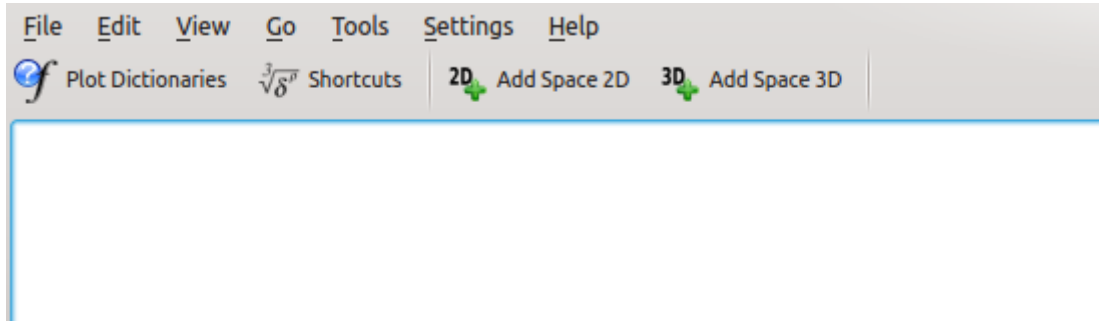
*Khipu space-3D*

### 1.1 Quick Start Guide

#### 1.1.1 Idea of Space

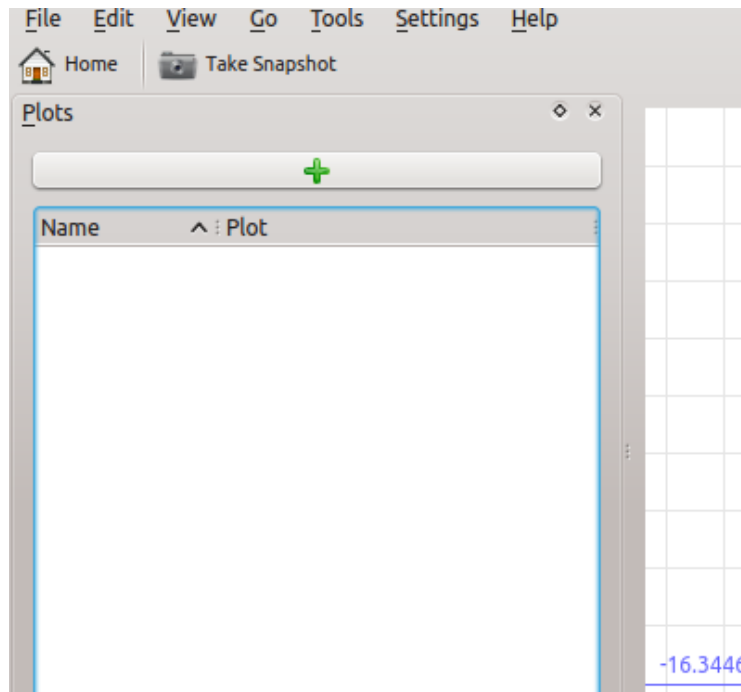
Khipu uses an abstraction of *space* in order to save the plots requested by user. A space will have its name and corresponding description from which it can be identified by the user later in time. Khipu has two types of spaces (2D and 3D). User can *save the plot* in either of the spaces depending on his/her wish. *Every space will contain multiple plots* of different colors, intervals and types.

### 1.1.2 How to plot functions in Khipu?



*Khipu-Add Space 2D/3D*

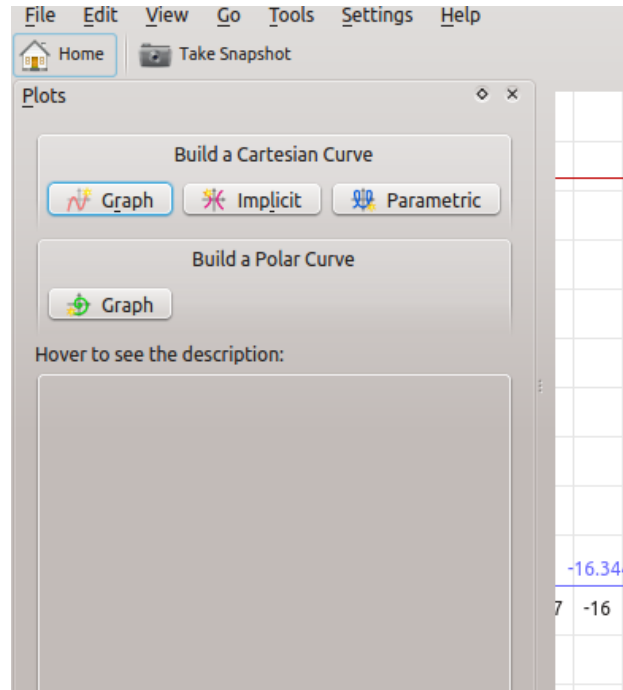
As mentioned above, Khipu draws functions in Space. So, there are two ways of adding a Space in Khipu based on the plot's dimension. When you are on the main window of Khipu (Dashboard in terms of Khipu's terminology), you will see a **Main Toolbar** which contains buttons of **Add Space 2D** and **Add Space 3D**. User can select either of them depending on the function he/she wants to plot.



*Khipu - Add Plot in Space*

#### 1.1.2.1 Plots represented in 2-Dimension

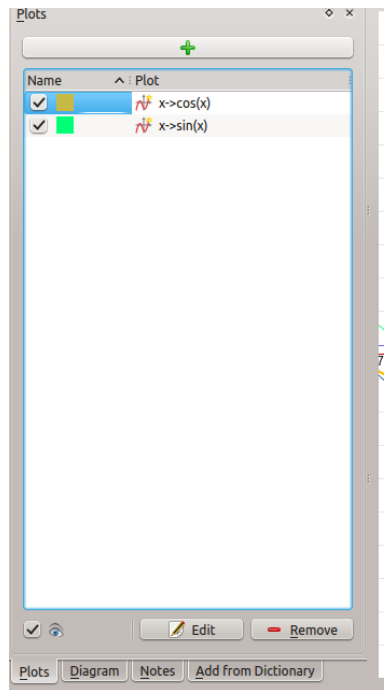
When the user clicks on **Add Space 2D**, it will redirect to the 2D space UI. Then he/she needs to click on the **green button** which will let the user to add a plot. Then, user needs to select a plot's type (for example, click on **Graph** in Cartesian section if you want to plot a sine curve!) You can add a plot's name by checking the plot name's check box. Then, user has to **add an appropriate equation** (Analitza-type equation) to see it's plot. If you don't want anything else, *just hit Enter*. You can even set the color of the plot by changing the option from the list of colors given below and set an appropriate interval for the arguments of the function.



*Khipu - 2D-Graph example*

### 1.1.2.2 Plots represented in 3-Dimension

When the user clicks on **Add Space 3D**, it will redirect to the 3D space UI. Then he/she needs to click on the **green button** which will let the user to add a plot. Then user needs to select a plot's type (for example, click on **Graph** in Cartesian section if you want to plot a simple surface!) You can add a plot's name by checking the plot name's check box. Then, user has to **add an appropriate equation** (Analitza-type equation) to see it's plot. If you don't want anything else, *just hit Enter*. You can even set the color of the plot by changing the option from the list of colors given below.



*Khipu - Edit/Remove plots*

### 1.1.3 How to edit/remove functions from Khipu?

User can edit or/and remove the already added plots.

#### 1.1.3.1 Editing an already added plot

You can edit a plot by just *double-clicking on the plot's entry* in the plots view or you can select the appropriate entry there and then click on the edit button shown below.

#### 1.1.3.2 Removing a plot

You can remove a plot by selecting a desired plot in the view and then click on the **Remove** button shown below.

## 1.2 Playing with Plot Dictionary

### 1.2.1 What is a Plot Dictionary?

A plot dictionary is a kind of text file (`.plots`) which contains a name of a plot along with its equation. The basic idea of dictionary files is to add plots in Khipu without actually typing big equations. User can add the plots based on its name using the dictionaries. We already have some predefined dictionaries which let a user enter some famous plots (i.e. curves and surfaces). User can even download the dictionaries using Internet.



### 1.2.1.1 Syntax

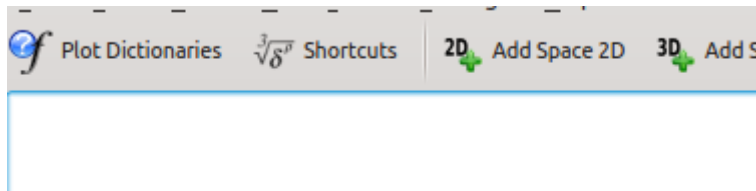
A syntax of a dictionary file follows Analitza syntax. Every line in a file will contain a name and the corresponding equation.

For example: A typical dictionary file would have lines as follows:

- `sinus := x->sin x`
- `plane1 := (x, y, z)->(x+y+z)-1`

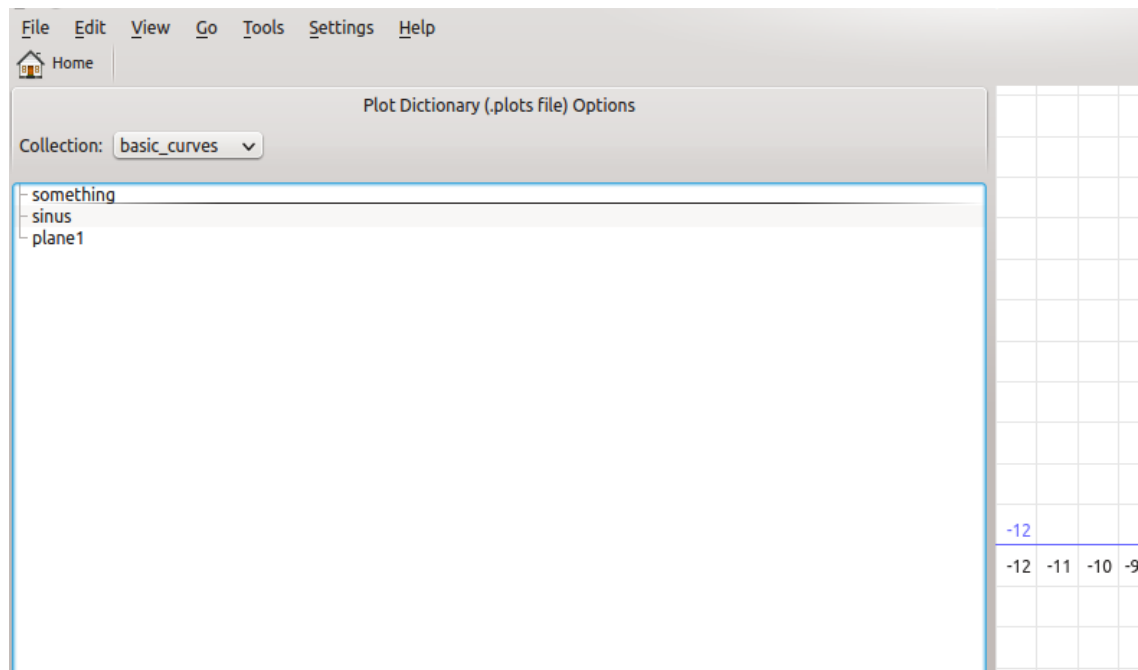
### 1.2.1.2 Adding your own dictionary file

The flexible Analitza syntax would allow the user to create his/her own dictionary file! User needs to save a text file with `.plots` extension with correct plot name and equations in each line.



*Khipu - Plot-Dictionary in main-toolbar*

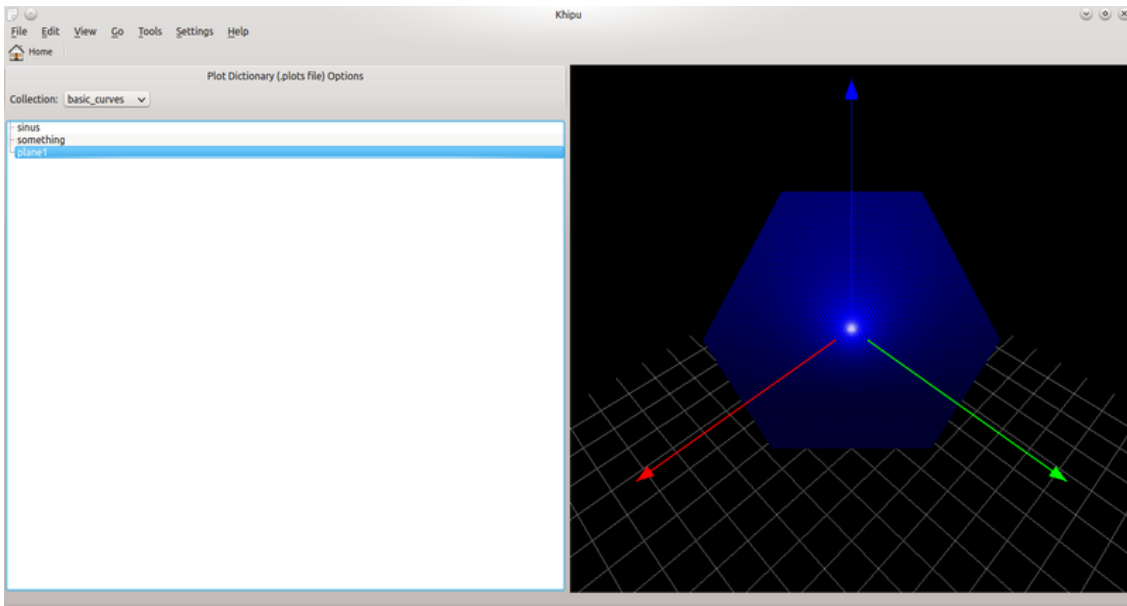
### 1.2.1.3 Let's have a look at the plots of the Dictionary files



*Khipu - Plot-Dictionary UI*

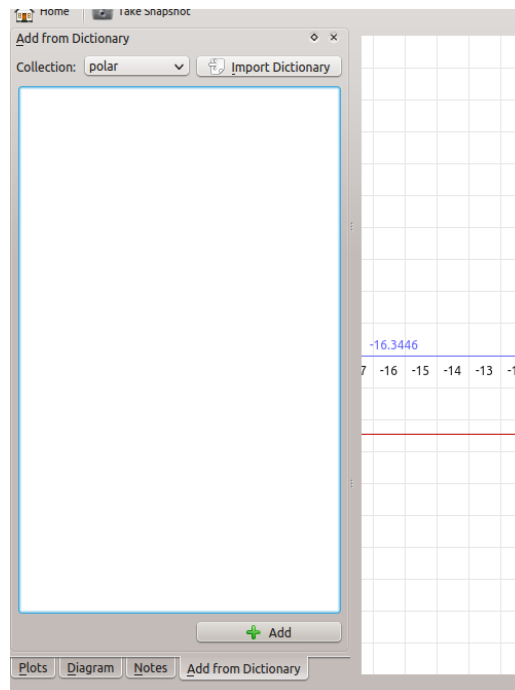
If you want to see how Khipu uses dictionary, just hit **Plot Dictionary** tab shown on the main toolbar of Khipu. Then switch to different names in the drop down box tagged by *collection*. Click on any of the plot's name and you will see a corresponding plot on the right side of the window.

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*Khipu - Plot-Dictionary UI*

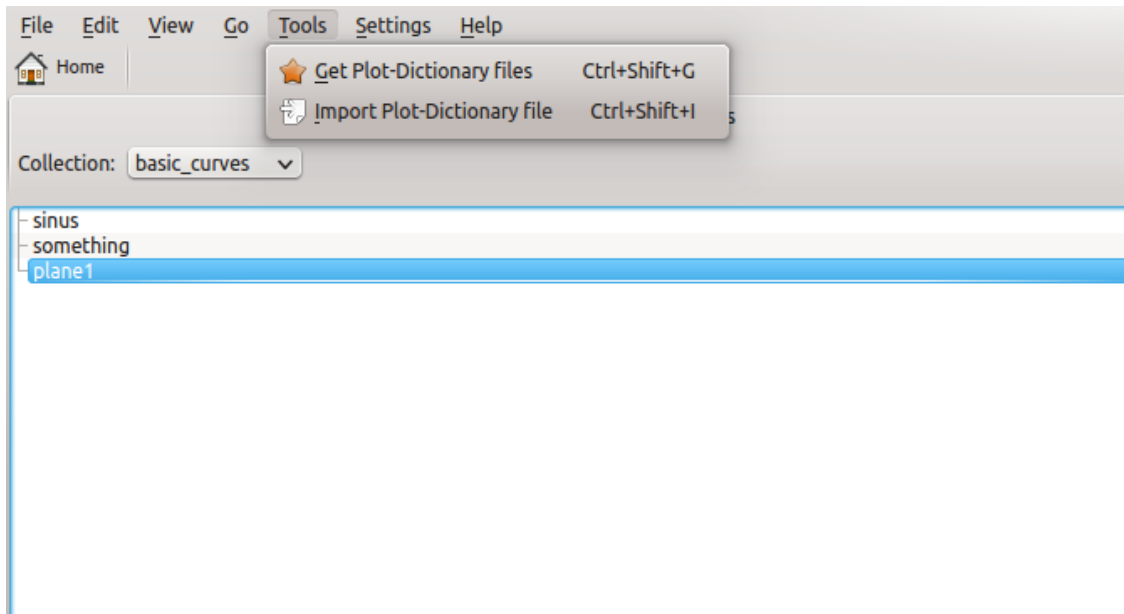
## 1.2.2 Adding plots from the Dictionary



*Khipu - Add plots from dictionary*

The main advantage of the dictionaries is to add the plots without typing big equations. For that, add any space in Khipu. Then switch to the **Add from Dictionary** tab. You can add the dictionary file there according to your wish. You just need to double click on the name of the plot to add it in the current Khipu Space.

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*Khipu - Import/Download dictionary*

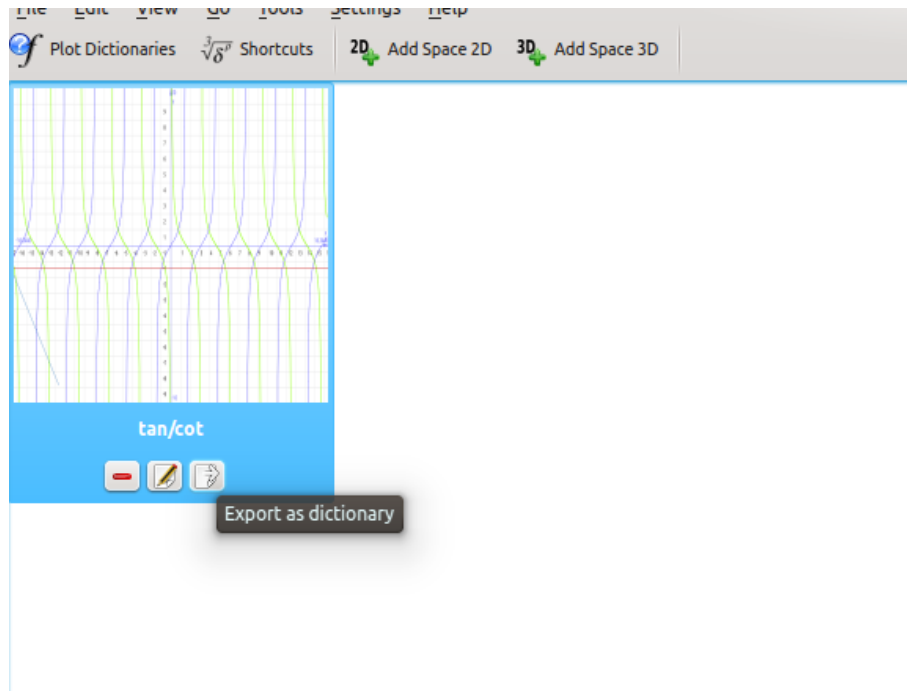
### 1.2.3 Import Dictionary File from a local disk

It is not that you can only add/see the plot from the predefined dictionaries available by Analitza. You can even import any downloaded/manually created dictionary in Khipu and can add the plots from it in Khipu Space!

### 1.2.4 Download Dictionary File from the Internet

The use of **Get Hot New Stuff API** in Khipu will allow the user to download these dictionary files from the web. In this way, a user can have a rich collection of dictionaries downloaded across the globe. You can achieve this by simply clicking on the **Get Plot Dictionary Files** from the Dictionary UI.

## 1.2.5 Export a space as a Dictionary



*Khipu - Export a space as dictionary*

User can even export a whole space into the dictionary with the names and equations of the plots saved in that particular space. For this, you have to click on go **Home** and then click on the *tool button* on the space thumbnail which tells you about exporting the space in dictionary.

## 1.3 Khipu: Beyond just plotting

### 1.3.1 Khipu's Application Actions

One of the key advantage of Khipu is to have *some other useful functionalities* to deal with the mathematical function's plotting apart from just plotting them. The various application actions and other features make Khipu more user-friendly.

#### 1.3.1.1 New/Open/Save/SaveAs

The normal actions of New, Open, Save and SaveAs allow the users to work with different sessions and *saving their work in persistence files (.khipu files)* which he/she can open later in time. The persistence file follows a *Qjson file format* which saves important information from the current session. This information includes name of spaces added, name and equations of the plots added in each space, plots' interval and their color.

#### 1.3.1.2 Save Plot as Image

In Khipu, every space will have its corresponding image which contains the plots requested by the user. The space image can be saved (PNG file) into the local disk using this application action.

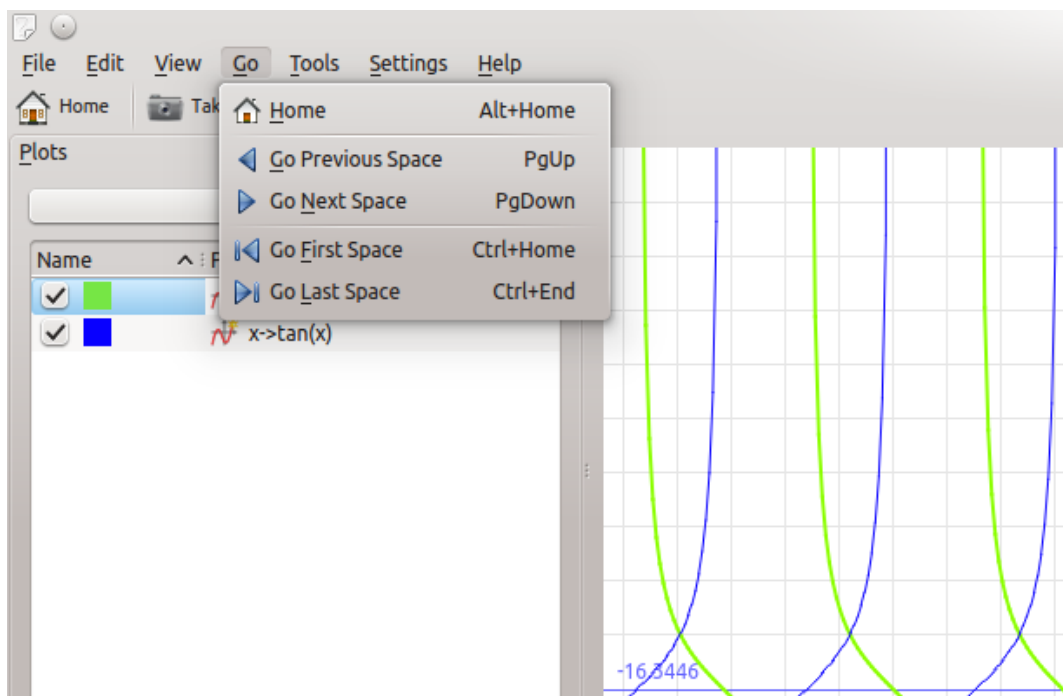
### 1.3.1.3 Take Snapshot

You can even copy the space image into clipboard using this action.

### 1.3.1.4 Want to see only a graph in the entire screen?

The full screen option in Khipu will allow the user to just only see the plot space. All the other docks and toolbars will be invisible while activating a full screen!

### 1.3.1.5 Space Navigation

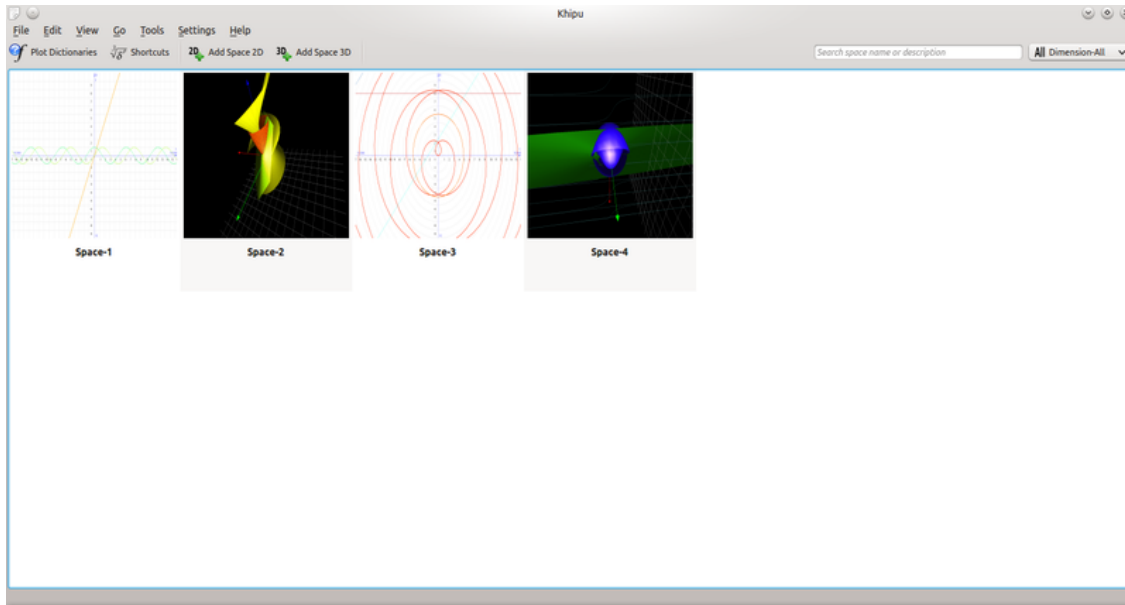


*Khipu - Space Navigation Options*

While a user is on any space (2D or 3D), he can switch to next/previous/first/last space in just one key stroke. The shortcuts for this are as follows:

- Navigate to the next space -> **PgUp**
- Navigate to the previous space -> **PgDn**
- Navigate to the first space -> **Ctrl+Home**
- Navigate to the last space -> **Ctrl+End**

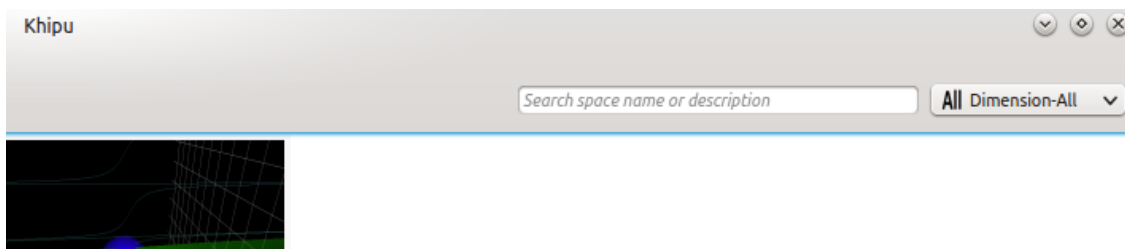
### 1.3.2 Dashboard: All the work available on the hands



*Khipu - Main Dashboard*

The main dashboard of Khipu contains all the spaces created by the user with its thumbnail and space's name. So a user can know which space he/she wants to modify or see their plots.

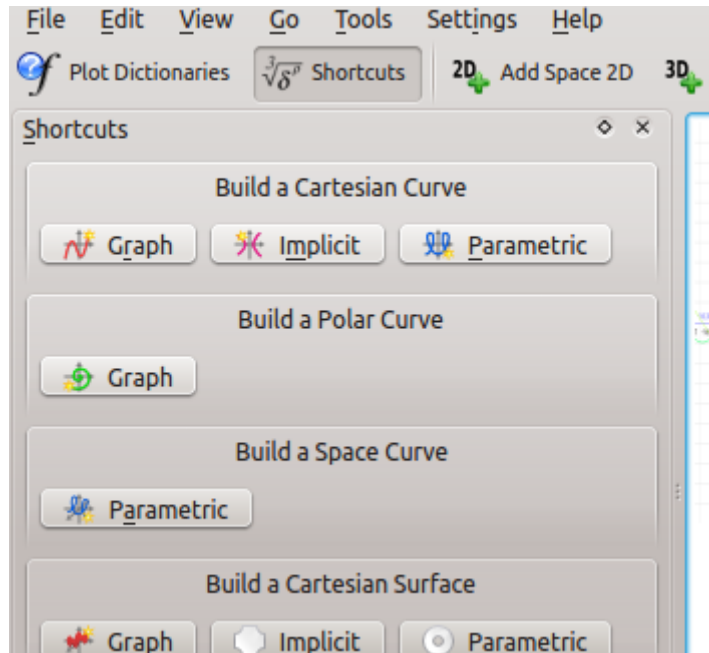
### 1.3.3 Space filter based on Title, Description and Dimension



*Khipu - Space filter*

The filter feature available on the dashboard will allow the user to filter the spaces based on their title and/or description. You can even filter the space based on the dimension chosen from the drop down box shown on the top-right corner on the Dashboard UI.

### 1.3.4 Shortcuts Dock: An easy way of plotting



*Khipu - Shortcuts Dock*

If a user wants to plot quickly without worrying about the spaces, the shortcuts dock will allow him/her to do so. For this, you need to type **S** and then select your plot type from that dock, type the equation, hit **Enter** and that's it!

### 1.3.5 Zoom In/out and Rotations in the plots view

The 2D and 3D space have a functionality from which you can zoom-in and/or zoom-out the plot-space by just scrolling up/down respectively. The 3D space has a support of rotations and shadows which let a user analyse the 3D plots from different angles!

## Chapter 2

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