

Building a GUI for plotting 3D Parametric Curves

Spoken Tutorial Project

<https://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

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FOSSEE Team

3 June 2021



Learning Objectives

In this tutorial, we will learn:



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- To plot the parametric equation of a sphere using GUI.



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- Use of surf command.



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- Use of mesh command.
- Use of meshgrid command.



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To record this tutorial, I am using:



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- **Ubuntu 18.04 OS**



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The process demonstrated in this tutorial is identical in Windows OS also.



Pre-requisites

To follow this tutorial:



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- **The learner must have basic knowledge of Scilab and GUI Builder toolbox.**



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To follow this tutorial:

- The learner must have basic knowledge of Scilab and GUI Builder toolbox.
- For pre-requisite Scilab tutorials please visit <https://spoken-tutorial.org>



Code Files

- The files used in this tutorial are provided in the Code files link.



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- Please download and extract the files.



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- Make a copy and then use them while practising.



What is a Parametric Equation of a Sphere?

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θ, ϕ = spherical coordinates



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- **surf**
- **mesh**



What is the surf command?

- The surf command draws a 3D parametric surface plot.



What is the surf command?

- The surf command draws a 3D parametric surface plot.
- It essentially creates a surface with a solid edge and solid face colors.



What is the mesh command?

- The mesh command draws a 3D parametric surface plot.



What is the mesh command?

- The mesh command draws a 3D parametric surface plot.
- The surface has solid edge colors but no face colors.



Scilab Help Documentation

For more information on mesh and surf commands type the following on the Scilab console:



Scilab Help Documentation

For more information on mesh and surf commands type the following on the Scilab console:

help surf

help mesh



Summary

In this tutorial, we have:

- **Plotted the parametric equation of a sphere using GUI.**
- **Used the surf command.**
- **Used the mesh command.**
- **Used the meshgrid command.**



Assignment

- Using surf and mesh, build a GUI to plot a 3D hemisphere.

Parametric equations:

$$x = r \cos \theta \sin \phi, \quad y = r \sin \theta \sin \phi \quad \& \\ z = r \cos \phi$$

- Place the hemisphere on a horizontal plane.



Assignment

- Change radius 'r' from 1 to 10 using a Slider and display it in a Text box.
- Consider that, (θ, ϕ) vary from 0 to π .
- Add grid lines to the plot and label the Axes.



About Spoken Tutorial Project

- Watch the video available at https://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- It summarises the Spoken Tutorial Project.
- If you do not have good bandwidth, you can download and watch it.



Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- Conducts workshops using spoken tutorials.
- Gives certificates to those who pass an online test.
- For more details, please write to contact@spoken-tutorial.org



Answers for THIS Spoken Tutorial

- Questions in THIS Spoken Tutorial?
- Visit <https://forums.spoken-tutorial.org/>
- Choose the minute and second where you have the question.
- Explain your question briefly.
- The Spoken Tutorial project will ensure an answer.
- You will have to register to ask questions.



- For any general or technical questions on Scilab, visit the FOSSEE forum and post your question.

<https://forums.fossee.in/>



Textbook Companion Project

- The FOSSEE team coordinates the Textbook Companion project.
- We give Certificates and Honorarium to the contributors.
- For more details, please visit:
https://scilab.in/Textbook_Companion_Project



Lab Migration

- The FOSSEE team coordinates the Lab Migration project.
- For more details, please visit:
[https://scilab.in/
Lab_Migration_Project](https://scilab.in/Lab_Migration_Project)



Acknowledgements

- **The Spoken Tutorial project is funded by the Ministry of Education, Government of India.**



Thank you

- This is Utkarsh Anand, a FOSSEE intern 2021, IIT Bombay signing off.
- Thanks for joining.

