

MatCont and PyDSTool

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Intro to MATCONT

MATCONT is a MATLAB-based bifurcation analysis tool

- ✿ GUI version (demo'd here), and command-line version
- ✿ Both do the same thing; command-line is useful for big software projects, GUI version for standalone analyses
- ✿ Fully integrated into MATLAB
- ✿ More sleek interface than XPP, and less prone to crashing!

MATCONT vs XPP

Feature	MatCont	XPPAUTO	PyDSTool
ODEs	y	y	y
PDEs (discretized)	n	y	n
DDEs	n	y	limited
SDEs	n	y	limited
DAEs	n	y	y
BVPs	n	y	n
Hybrid systems	n	limited	y
Main language	MATLAB	C	Python
Simulation tools	y	y	y

MATCONT vs XPP

Bifurcation Type	Codimension	MatCont	XPPAUTO	PyDSTool
Equilibrium	0	C	D,C	D,C
Limit cycle	0	C	C	C
Limit point	1	D,C	D,C	D,C
Hopf	1	D,C	D,C	D,C
Limit point of cycles	1	D,C	-	D
Neimark-Sacker	1	D,C	D,C	D,C
Period doubling	1	D	D,C	D,C
Homoclinic	1	C	C	-
Cusp	2	D	-	D
Bogdanov Takens	2	D	-	D
Zero-Hopf	2	D	-	D
Double Hopf	2	D	-	D
Generalised Hopf	2	D	-	D
Cusp point of cycles	2	D	-	-
Chenciner	2	D	-	-
Fold-Neimark-Sacker	2	D	-	-
Flip-Neimark-Sacker	2	D	-	-
Fold-Flip	2	D	-	-

Obtaining MATCONT

The screenshot shows the SourceForge project page for MatCont. The browser address bar displays `sourceforge.net/projects/matcont/`. The SourceForge header includes navigation links for Open Source Software, Business Software, and Resources, along with social media icons and a search bar. A red banner for LastPass is visible. The MatCont project page features the project logo, title, and description: "Numerical Bifurcation Analysis Toolbox in Matlab". It also shows a star rating of 5 stars with 30 reviews, download statistics (191 this week), and the last update date (2020-04-30). A prominent green "Download" button is present. Below the project details, a tabbed interface shows the "Summary" tab selected, containing a description of the software and its authors. To the right, there is an advertisement for HPE GreenLake and a "Sign Up" button.

sourceforge.net/projects/matcont/

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MatCont

Numerical Bifurcation Analysis Toolbox in Matlab

Brought to you by: [hilmeijer](#), [willy_govaerts](#)

★★★★★ 30 Reviews Downloads: 191 This Week Last Update: 2020-04-30

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MatCont is a Matlab software project for the numerical continuation and bifurcation study of continuous and discrete parameterized dynamical systems. Leaders of the project are Willy Govaerts (Gent,B) and Yuri A. Kuznetsov (Utrecht,NL) and Hil G.J. Meijer (UT, Enschede, NL).

Matcont for ODE's and MatcontM for Maps

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No, Thank you

Step 1: navigate to `https://sourceforge.net/projects/matcont/`

Obtaining MATCONT

The screenshot shows the SourceForge website interface. At the top is the SourceForge logo and navigation links: Open Source Software, Business Software, Resources, Help, Create, Join, and Login. A search bar is on the right. Below the navigation bar, there's a section for 'Advanced Email Customization'. The main content area features the 'MatCont' download page. The page has a dark theme with a logo on the left and text on the right. The text says 'MatCont Numerical Bifurcation Analysis Toolbox in Matlab Brought to you by: hilmeijer, willy_govaerts'. Below this, it says 'Your download will start shortly...' with a green circular arrow icon. There are three buttons: 'Get Updates', 'Share This', and 'Problems Downloading?'. The file name 'MatCont7p2.zip' is displayed. Below this is a section titled 'Other Useful Business Software' with a small image of a visitor management system. A 'Save As' dialog box is open in the foreground, showing the file 'MatCont7p2' being saved as a 'Compressed (zipped) Folder' in the 'Documents' directory. The dialog box has a 'File name' field with 'MatCont7p2' and a 'Save as type' dropdown set to 'Compressed (zipped) Folder'. There are 'Save' and 'Cancel' buttons at the bottom right of the dialog box.

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MatCont

Numerical Bifurcation Analysis Toolbox in Matlab
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MatCont7p2.zip

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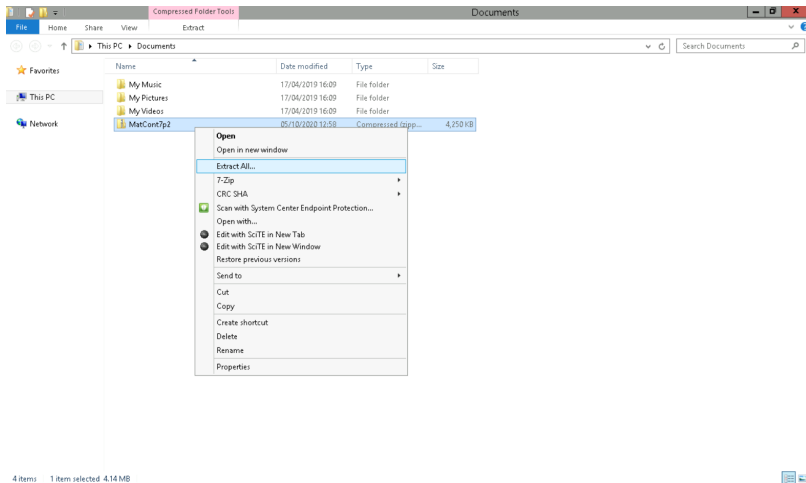
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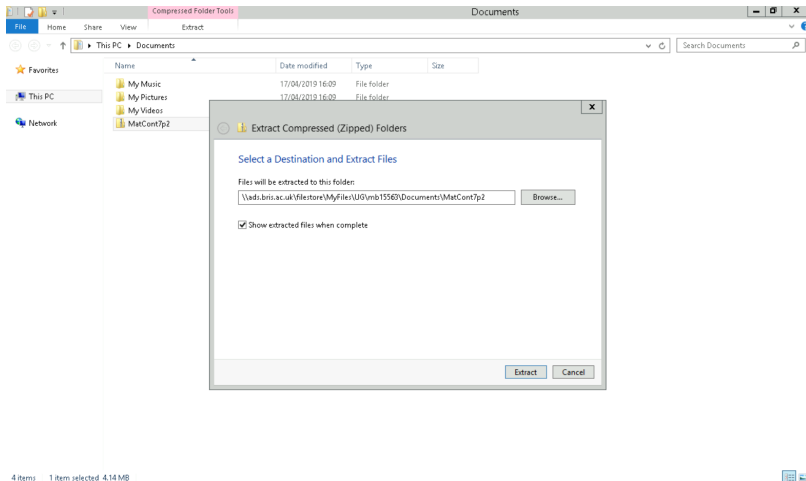
Step 2: hit the download button and save somewhere memorable

Obtaining MATCONT



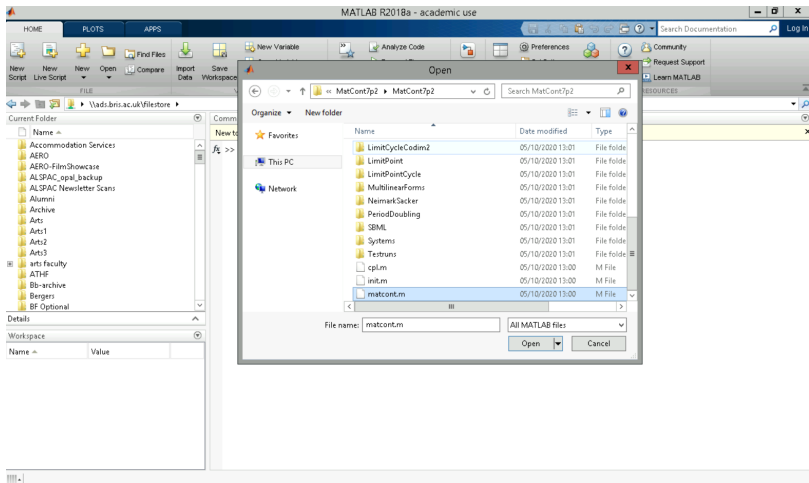
Step 3: navigate to and extract the ZIP folder

Obtaining MATCONT



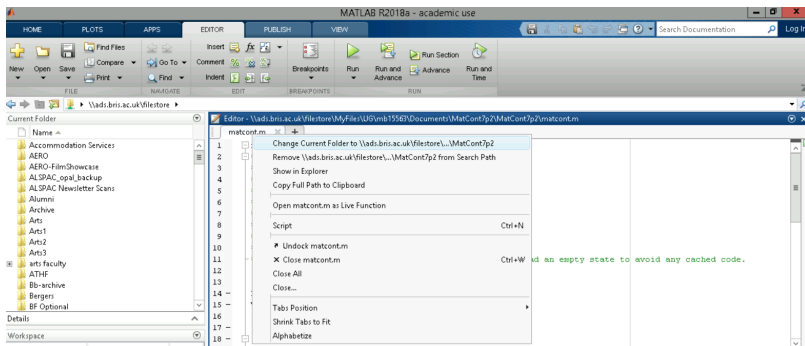
Step 3: navigate to and extract the ZIP folder

Obtaining MATCONT



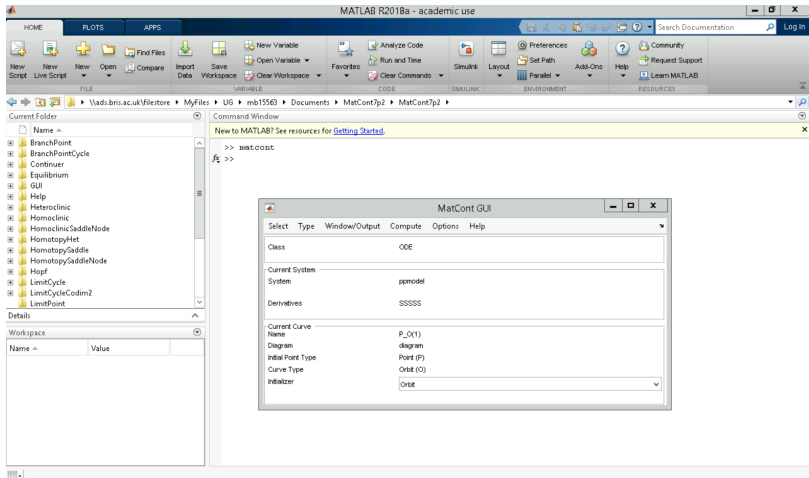
Step 4: open MATLAB and matcont.m

Obtaining MATCONT



Step 5: right-click, change current folder to ... Matcont

Obtaining MATCONT



Step 6: launch MATCONT by typing 'matcont' into the prompt

Issues

MATCONT requires a compiler. If you can't run it, it'll likely be a compiler issue. The solution depends on your system. Google is your friend here.

live demo

PyDSTool

- ✦ Python-based continuation package
- ✦ Simulation and analysis routines for nonlinear dynamical systems
- ✦ More scope to integrate into scientific computing applications
- ✦ Steeper learning curve
- ✦ Developed by a Bristol alumnus!

<https://github.com/robclewley/pydstool>