

ROOTLOCS

Program Description

ROOTLOCS is a free, easy-to-use program for plotting root locus diagrams of single-input-single-output continuous and sampled-data feedback control loops. Given a system’s open loop transfer function, ROOTLOCS plots the loci of the system’s closed loop poles as the loop gain parameter is increased indefinitely, starting from 0.

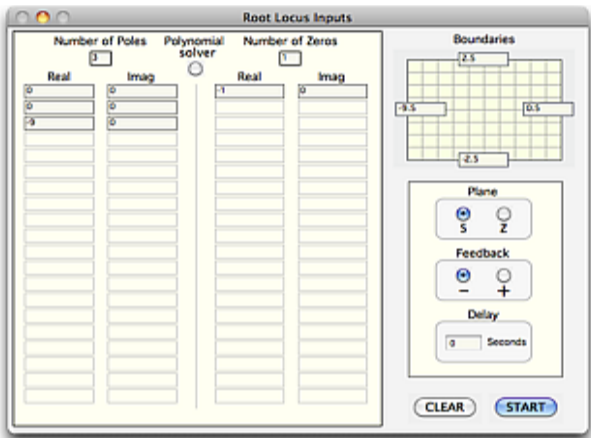
The program can accommodate systems with up to 40 singularities (20 poles and 20 zeros) and is able to handle loops of either polarity (i.e. positive or negative feedback sign), as also those with time delay.

When the root locus diagram has been plotted, tools built into the program enable the user to display the gain, the damping, the time response and the frequency response of the system at any point on the locus path. Furthermore, the user is able to interact with the plot by adding, deleting and repositioning poles and zeros graphically, whereupon the locus is immediately recomputed and redrawn. Step-by-step guidance on the use of every program feature is provided in the form of a built-in 'Help Book'.

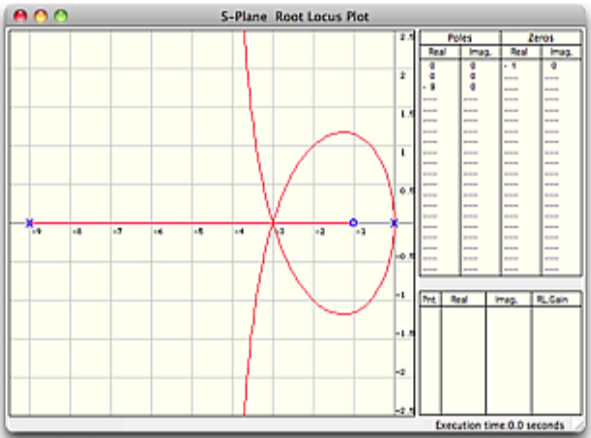
ROOTLOCS is a fast and powerful tool that should prove of value to students of control engineering and practising engineers alike. In order to use the program effectively, newcomers to the root locus method are advised to familiarise themselves with at least the basic principles of the technique by consulting any good text book on classical control.

More in-depth documentation of the program is available as a separately downloadable document at <http://www.coppice.myzen.co.uk/>

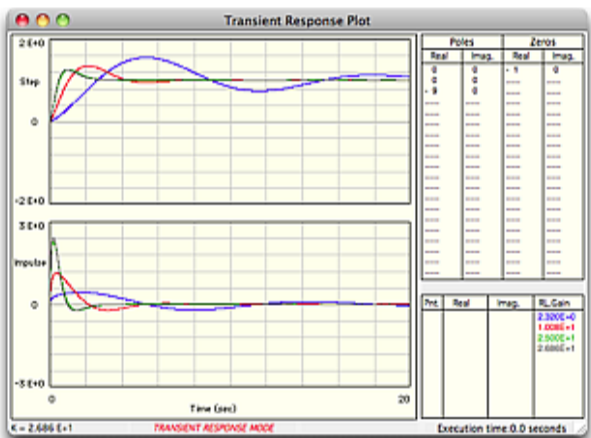
Screenshots



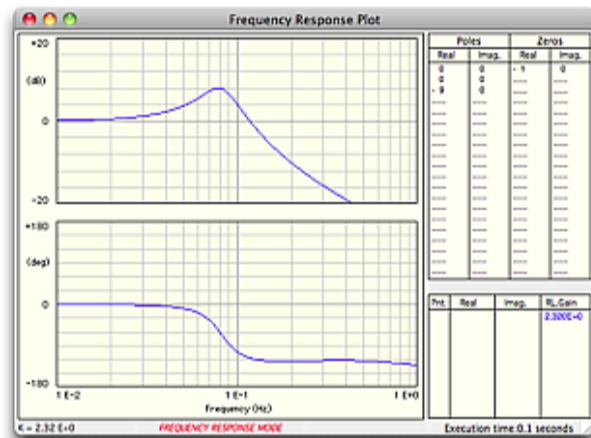
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Root Locus Plot



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Recalling the Input Window

Program Description

RootLocs is a program for plotting Root Locus diagrams of Single Input Single Output (SISO) feedback loops. It can handle continuous and sampled data systems up to 20th order, with either positive or negative loop gain, and with the presence or not of time delay in the loop. Generic block diagrams illustrating the types of loops covered are shown on the next page.

The program has two windows, i.e. an INPUT window and an OUTPUT window, only one of which is visible at any time.

The Input window appears on program launch and contains numerous fields and buttons for defining the parameters of the system and the properties of the locus plot.

The Output window is invoked by clicking the START button and displays the locus plot initially from which other types of plot can then be generated if required.

When the locus plot is showing, tools and features built into the program allow the user to:

- find the root locus gain at any locus point
- mark the position of a specified gain on every locus branch
- superimpose isodamping lines on the plot
- display the step, impulse and frequency response at any locus point
- add, delete and reposition poles and zeros with the mouse
- poll the order of any singularity
- magnify any rectangular region of the plot
- scroll the complex plane in any direction

The program is easy to use and takes only a short time to learn. For users who have some knowledge of the root locus method it provides a powerful and useful tool for control system analysis and design.

Help Book

Program Versions and System Requirements

ROOTLOCS is available in two versions : Mac and PC. The Macintosh version of the program should work on any computer running Mac OS X 10.0 or higher. The PC version (supplied as an executable file without installer) should work on any machine running Windows 95 or later.