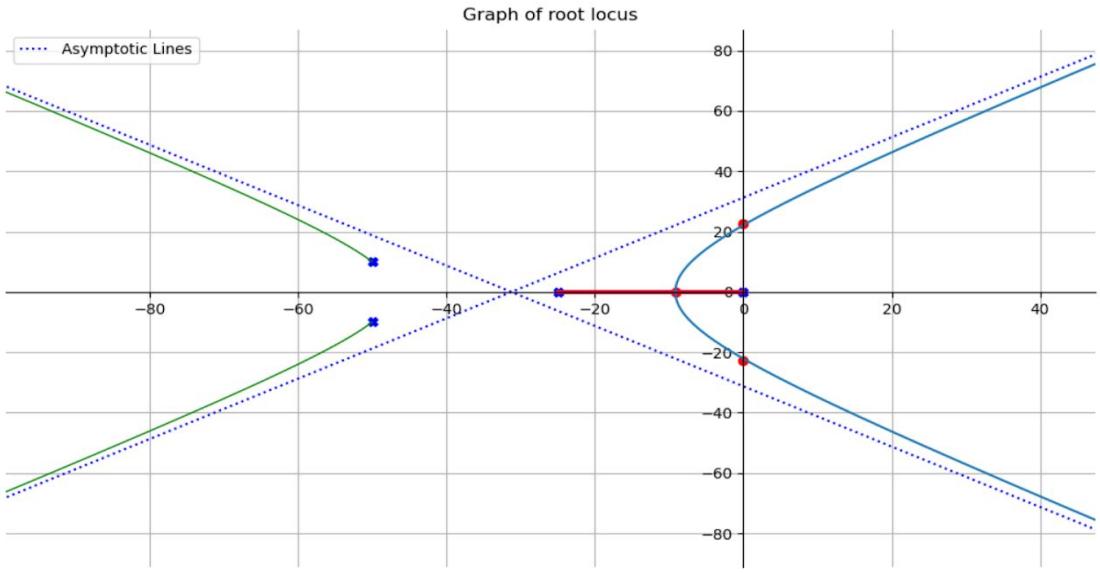
Root Locus Plotter

Control Systems Analysis



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Source Code :

https://github.com/khadijaAssem/RootLocusPlotter

Overview

Root locus is very important to specify how the roots of a characteristic equation move around the S- plane as we change the parameter.It is a powerful tool for designing and analyzing feed-back control systems.

Project Description

The project plots the root locus of the transfer function.

Main Features :

1. Plotting Root Locus.
2. The program prints all the information about the intermediate calculations done while plotting.

```
Poles  [0, -25, (-50-10j), (-50+10j)]
Sigma equals  (-31.25+0j)
Angles are  [45.0, 135.0, 225.0, 315.0]
Expression is  k + s**4 + 125.0*s**3 + 5100.0*s**2 + 65000.0*s
Derivative is  4*s**3 + 375.0*s**2 + 10200.0*s + 65000.0
Solving derivative we find s =  [-45.9594405584276 + 0.e-22*I, -38.6401693047594 - 0.e-22*I, -9.15039013681293 + 0.e-20*I]
We choose the break away poit  =  (-9.150390136812927+2.710505431213761e-20j)
Routh stability criterion table :
 [[1.00000000000000, 5100.00000000000, 1.0*k], [125.000000000000, 65000.0000000000, 0], [4580.00000000000, 1.0*k, 0], [65000.0 - 0.027292576419214*k, 0, 0], [1.0*k, 0, 0]]
Auxillary equation equal  4580.0*s**2 + 2381600.0
S's from auxillary equation are :  [-22.8035085019828*I, 22.8035085019828*I]
C:\Users\hp\AppData\Local\Programs\Python\Python38\lib\numpy\core\_asarray.py:85: ComplexWarning: Casting complex values to real discards the imaginary part
```