EENG307: PD Design Using Root Locus and SISOtool[1]

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Lecture 19

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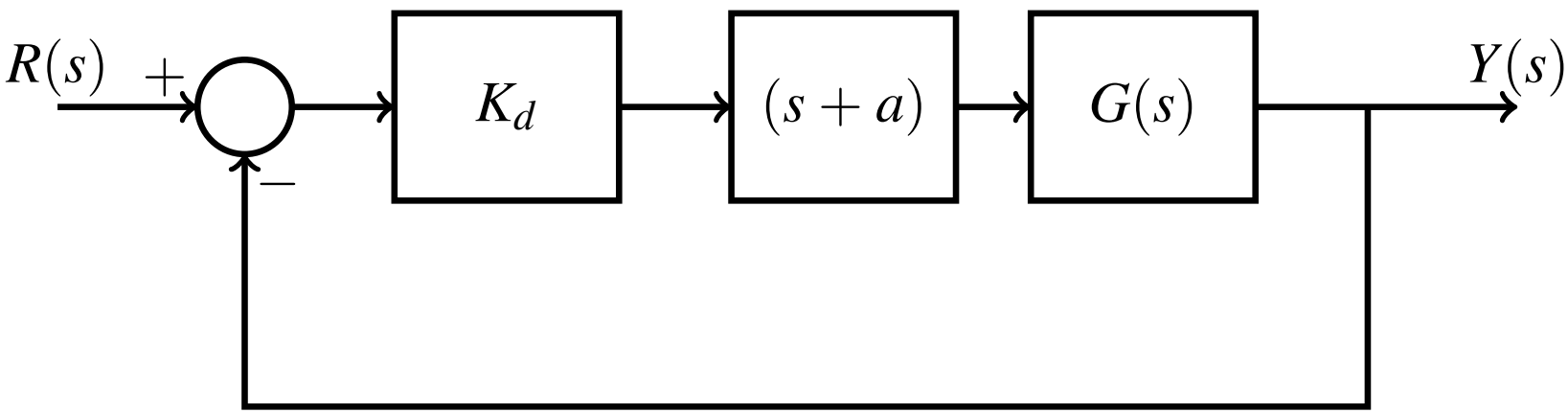
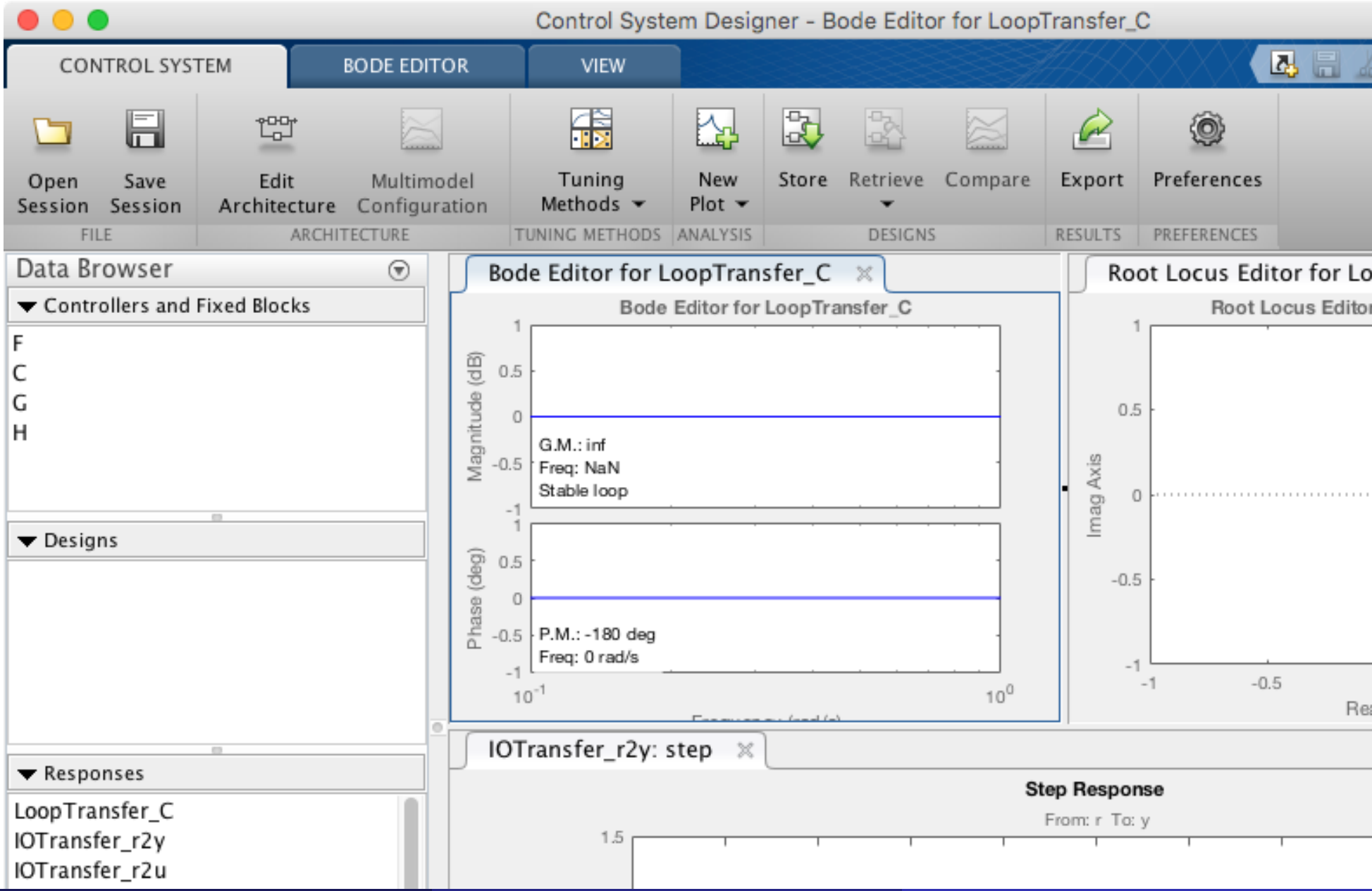
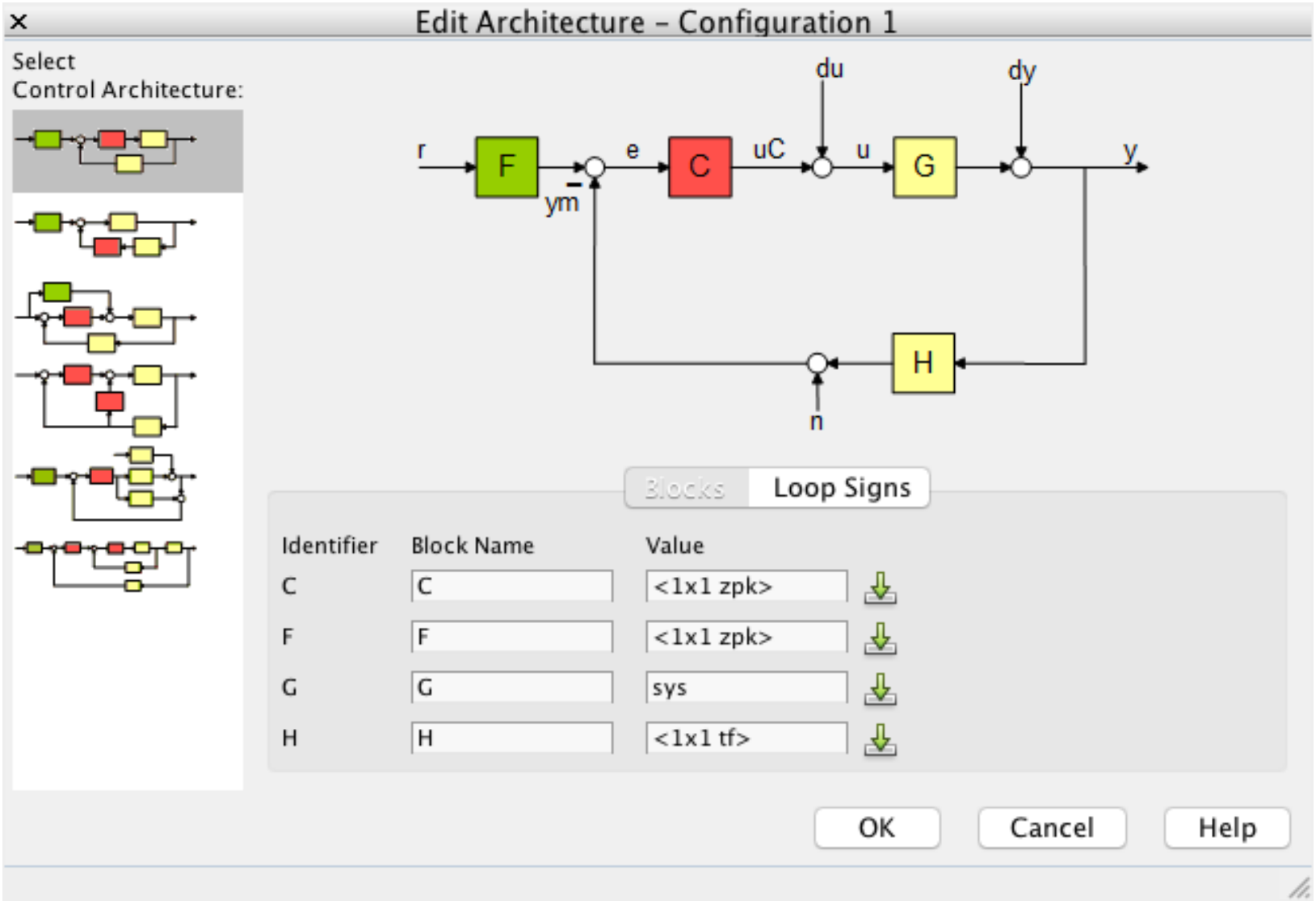
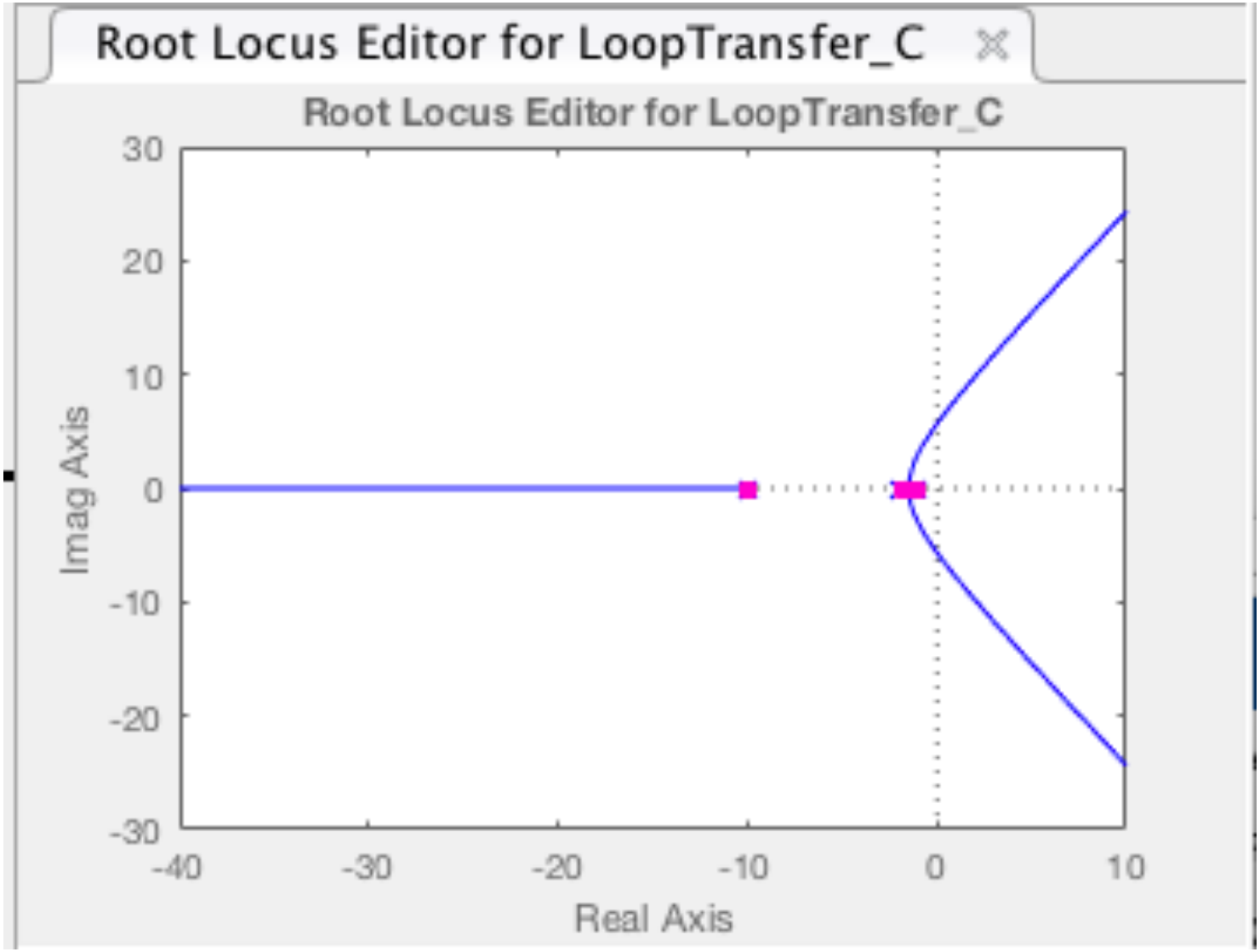
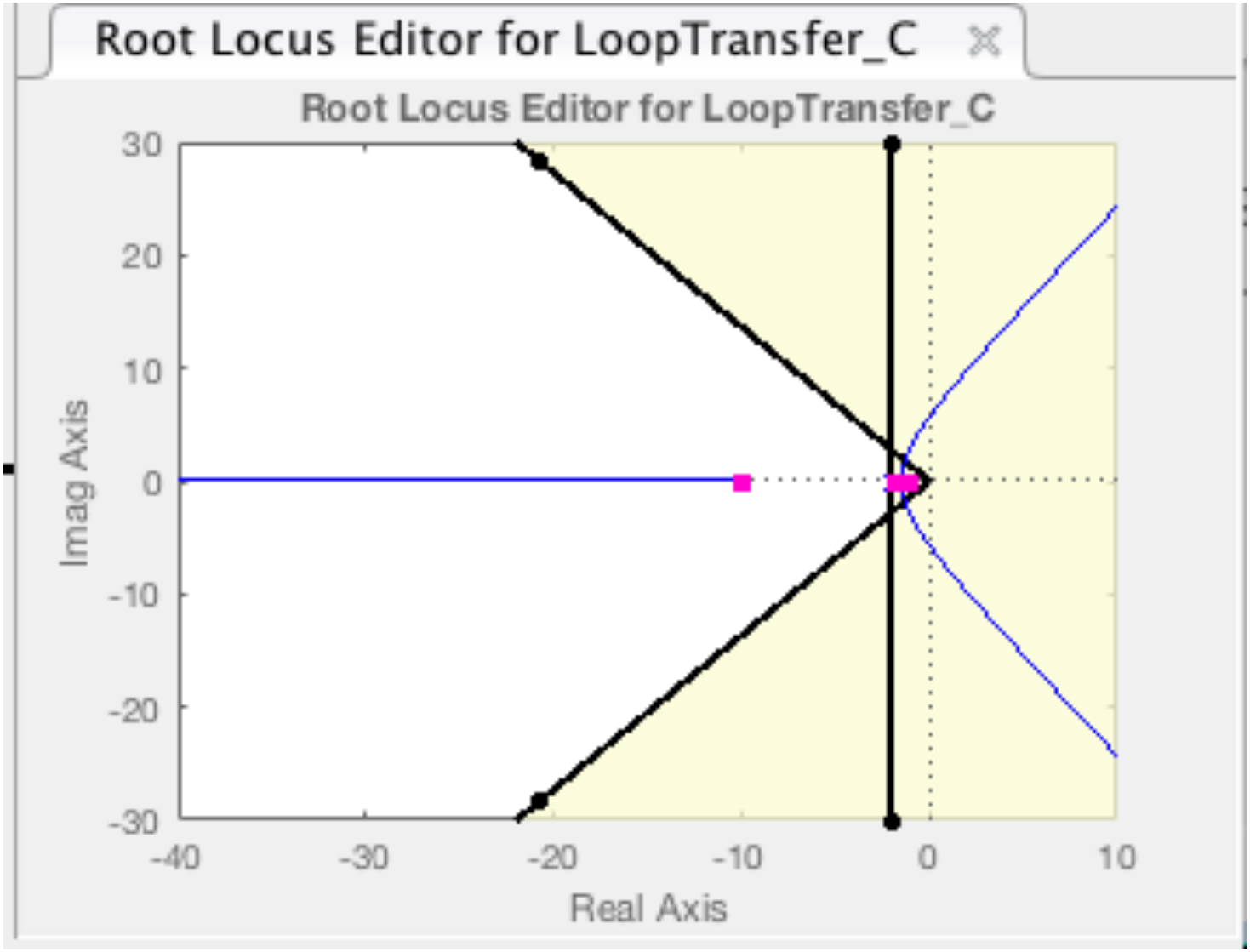
Root Locus Design Problem

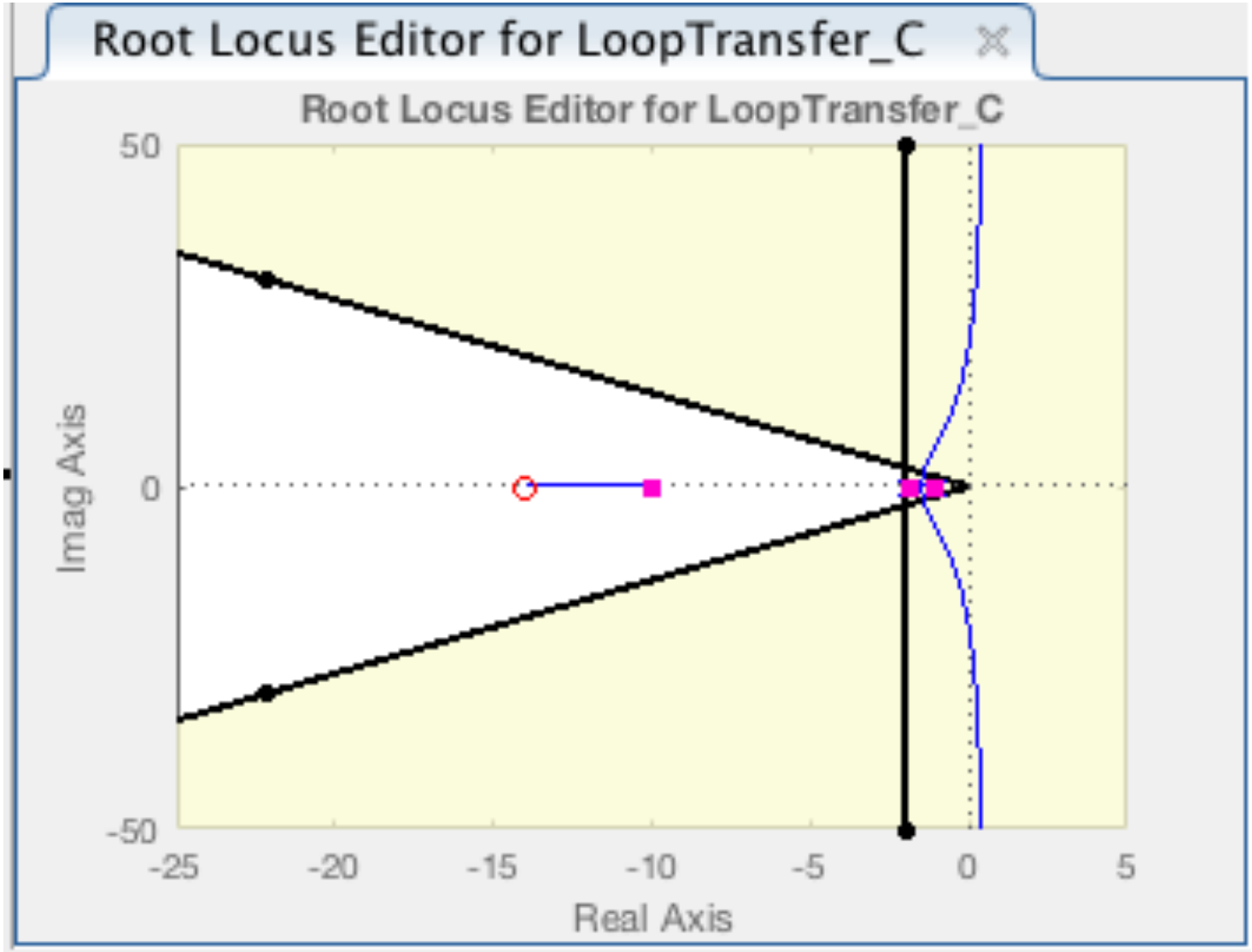


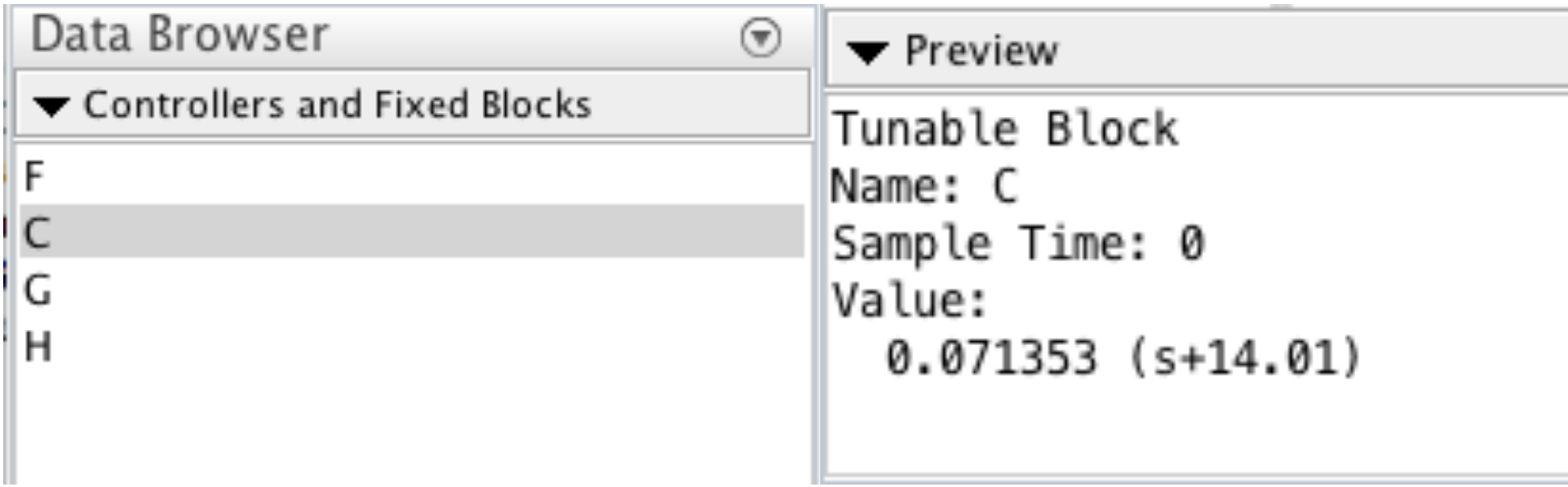

Control System Designer - Bode Editor for LoopTransfer_C
CONTROL SYSTEM
BODE EDITOR
VIEW
Open Session
Save Session
Edit Architecture
Multimodel Configuration
Tuning Methods
New Plot
Store
Retrieve
Compare
Export
Preferences
FILE
ARCHITECTURE
TUNING METHODS
ANALYSIS
DESIGNS
RESULTS
PREFERENCES
Data Browser
Controllers and Fixed Blocks
F
C
G
H
Designs
Responses
LoopTransfer_C
IOTransfer_r2y
IOTransfer_r2u
Bode Editor for LoopTransfer_C
Bode Editor for LoopTransfer_C
Magnitude (dB)
Phase (deg)
G.M.: inf
Freq: NaN
Stable loop
P.M.: -180 deg
Freq: 0 rad/s
Root Locus Editor for Lo
Root Locus Editor
Imag Axis
IOTransfer_r2y: step
Step Response
From: r To: y

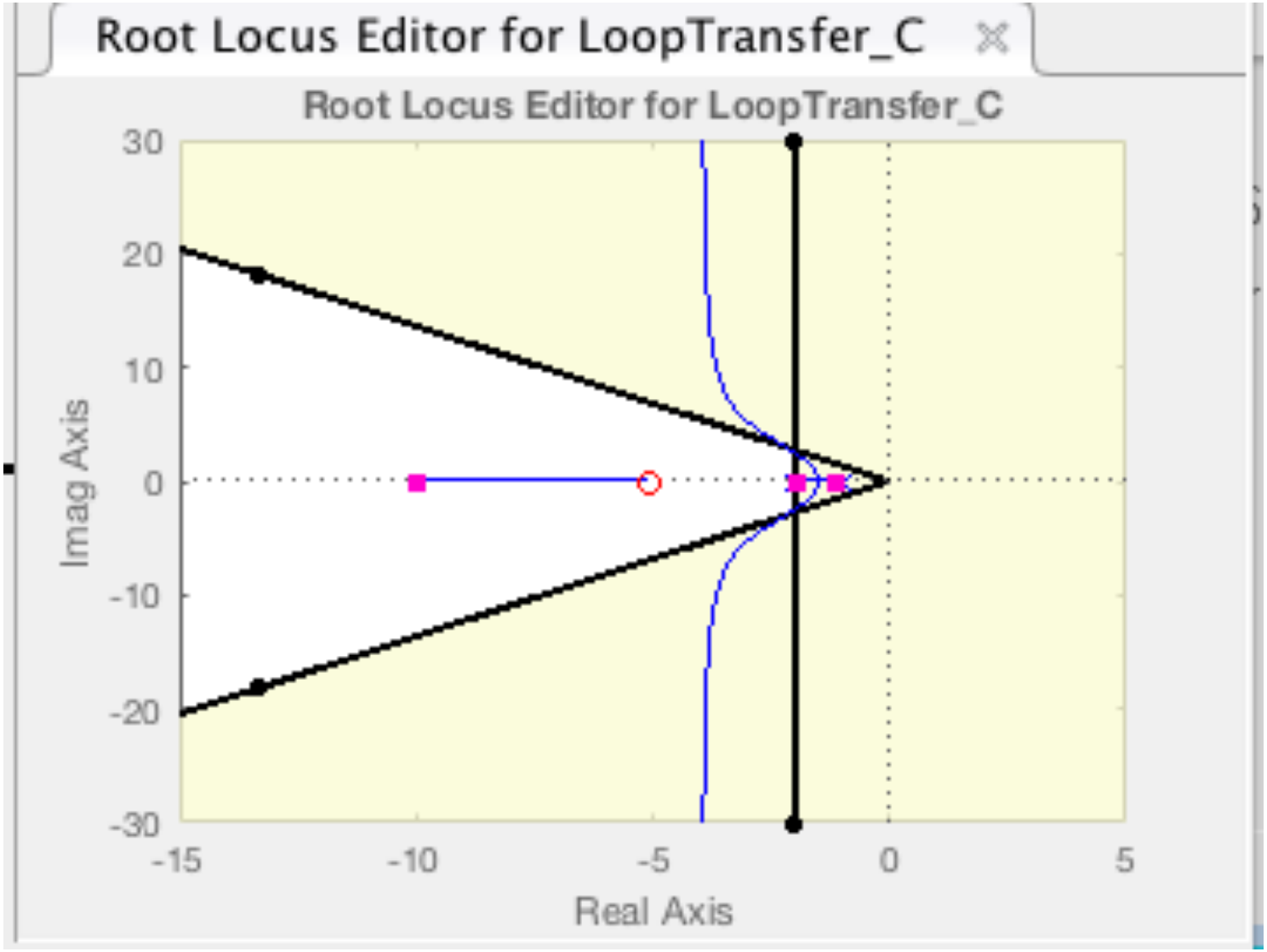

Edit Architecture – Configuration 1
Select
Control Architecture:
r
F
ym
e
C
uC
du
u
G
dy
y
H
n
Blocks
Loop Signs
Identifier
Block Name
Value
C
C
<1x1 zpk>
F
F
<1x1 zpk>
G
G
sys
H
H
<1x1 tf>
OK
Cancel
Help

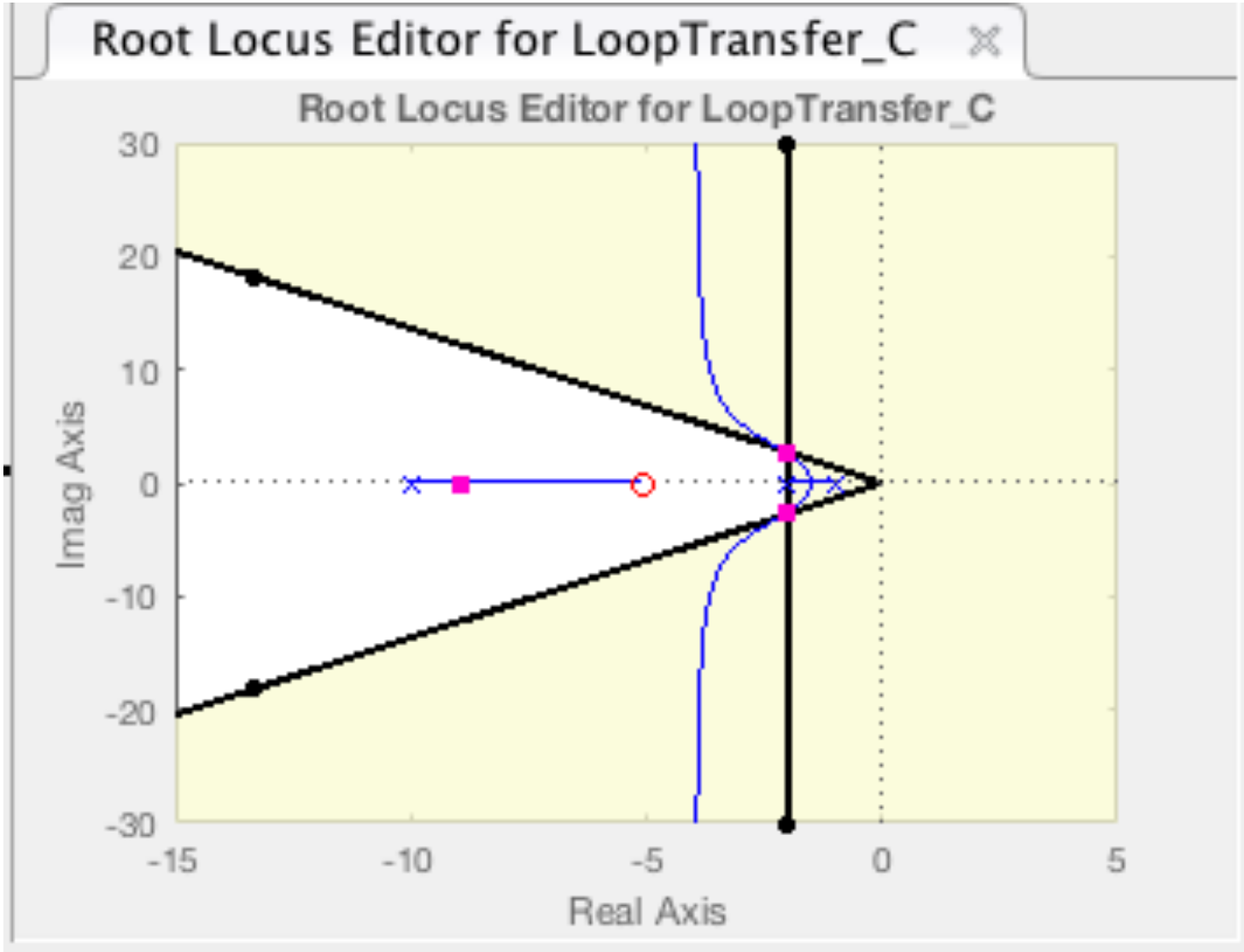

Root Locus Editor for LoopTransfer_C
Root Locus Editor for LoopTransfer_C
30
20
10
0
-10
-20
-30
Imag Axis
-40
-30
-20
-10
0
10
Real Axis

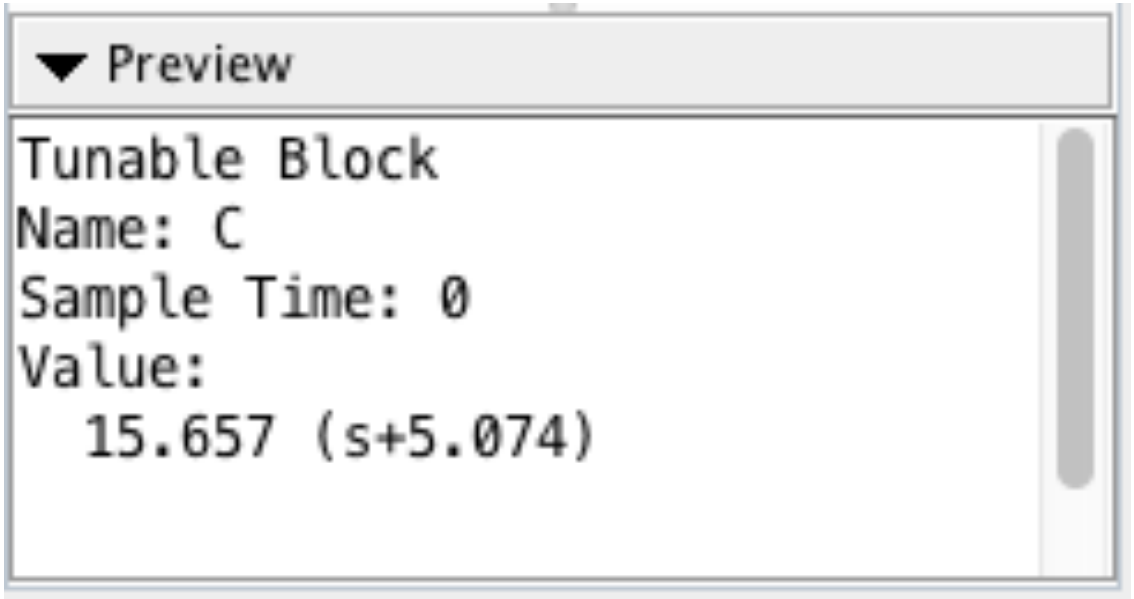

Root Locus Editor for LoopTransfer_C
Root Locus Editor for LoopTransfer_C
30
20
10
0
-10
-20
-30
Imag Axis
-40
-30
-20
-10
0
10
Real Axis

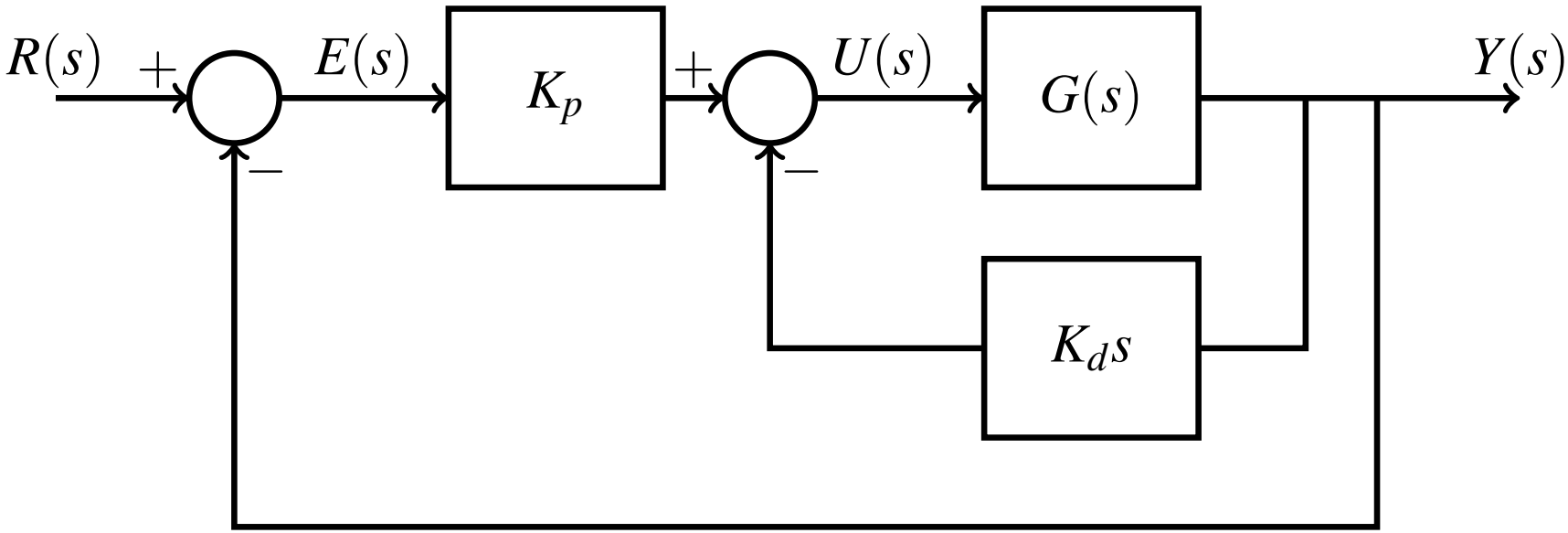

Root Locus Editor for LoopTransfer_C
Root Locus Editor for LoopTransfer_C
50
0
-50
Imag Axis
-25
-20
-15
-10
-5
0
5
Real Axis


Data Browser
Controllers and Fixed Blocks
F
C
G
H
Preview
Tunable Block
Name: C
Sample Time: 0
Value:
0.071353 (s+14.01)


Root Locus Editor for LoopTransfer_C
Root Locus Editor for LoopTransfer_C
30
20
10
0
-10
-20
-30
Imag Axis
-15
-10
-5
0
5
Real Axis


Root Locus Editor for LoopTransfer_C
Root Locus Editor for LoopTransfer_C
30
20
10
0
-10
-20
-30
Imag Axis
-15
-10
-5
0
5
Real Axis


Preview
Tunable Block
Name: C
Sample Time: 0
Value:
15.657 (s+5.074)


R(s)
+
E(s)
K_p
+
U(s)
G(s)
Y(s)
−
−
K_d s

```
» step(T)
```