Mike Hickey

Professor Tom

Digital Signals Processing

Lab 5 Hidden Figures

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Forward Distance

Initial Conditions

Substitute

Multiply everything by T

Apply Z Transform notation

Use the electric boogaloo table

Apply initial conditions

Factor out Y(z)

Isolate

Solve for poles

Pole found

Backward Distance

Initial Conditions

Substitute

Multiply everything by T

Apply Z Transform

Use the electric boogaloo table

Factor out Y(z)

Isolate

Solve for Pole

Algebra

Pole Found

Step 5: Z.T.F. Table

Forward Distance

Initial Conditions

Substitute

Multiply everything by T

Apply Z Transform notation

Use the electric boogaloo table

Apply initial conditions

Factor out Y(z)

Add z to both sides

Isolate Y(z)

Continue on the next page

Get into a Z transform format to perform an inverse Z transform

Multiply the numerator and denominator by

Factor out

This looks like the format

Where

Apply inverse Z transform

Use the T Transform Table

Done

Step 6: Continuous Time Function

Plot

Range from

Intervals of

Plot of

A picture containing text

Description generated with high confidence

Step 7: Comparison Plot

A screenshot of a cell phone

Description generated with high confidence

Step 8: Detailed Response

I would prefer to use the backward distance method in approximating the solution to this differential equation because the backward distance is much more accurate and stable. The forward distance formula for plot 1 is quite unstable. However, the backward distance formula for plot 2 is very stable. Also, the approximation for backward distance is quite accurate. The two lines are almost on top of each other. I choose backward distance.

Step 9: For Fun Not for Credit

Ancient as of 1783, sure Sheldon; sure...