Problem Wk.5.5.4: Analyzing the System

Read the handout for Homework Assignment 2.

**Gains**

**Best Gain**

Enter the best value you found for $k_c$ you found for when $T = 0.005$ seconds. Make sure your answer is accurate to within 0.0001 of the theoretical best gain.

Best value of $k_c$ when $T = 0.005$ seconds: __________

Enter the poles associated with these values of $k_c$ and $T$. If a pole appears $n$ times, enter it into $n$ boxes. If there are more boxes than poles, enter "none" in the remaining boxes.

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**Rationale**

Use the following text box to answer these questions:

- Why must the gain be positive?
- How did you find the best gain?

**Regions**

Answer the following questions about how the behavior of the system depends on the gain $k_c$, when $T = 0.005$ If you used empirical methods, make sure your answer is accurate to within 0.0001 of the theoretical best answer.

- For what range of $k_c$ is the system monotonically convergent?
For what range of $k_c$ is the system oscillatory and convergent?

$< k_c <$

What is the lowest positive value of $k_c$ for which the system is unstable?

$k_c =$

**Plots**

Upload a single PDF containing plots of the following. Clearly label each plot with the value of $k_c$ used to generate the plot.

- The best non-oscillatory response
- An oscillatory but stable response
- An oscillatory, unstable response

**Effect of $T$**

In the following textbox, answer these questions:

- What happened when you increased/decreased $T$?
- Why?