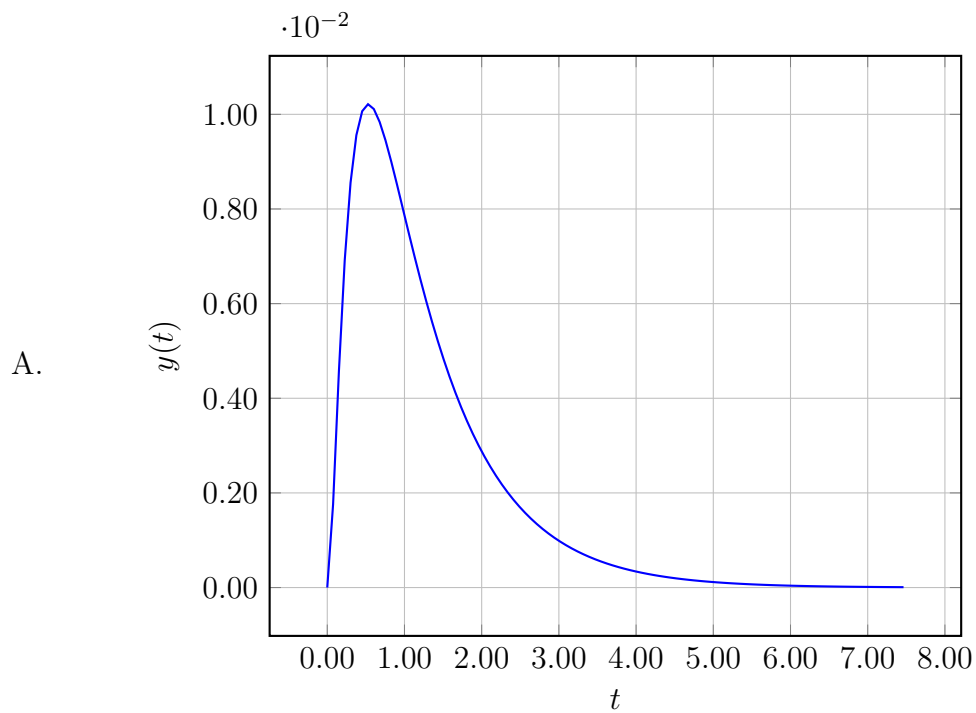


1. (35 points) An open-loop transfer function is given as,

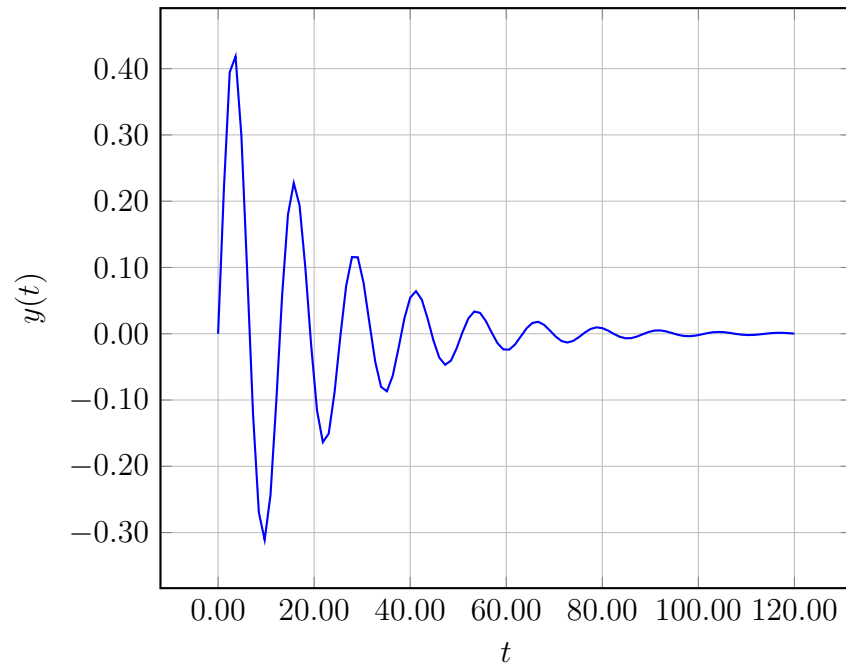
$$G(s) = \frac{1}{s^3 + 2.0s^2 + 3.0s + 7.0}$$

which of the following PI-controllers stabilizes the system in a closed-loop unit feedback structure?

- A. $F(s) = 0.5 + \frac{1.0}{s}$
 - B. $F(s) = -10.0 + \frac{1.0}{s}$
 - C. $F(s) = -10.0 + \frac{2.5}{s}$
 - D. $F(s) = 0.5 + \frac{2.5}{s}$
 - E. $F(s) = -2.5 + \frac{0.5}{s}$
2. (35 points) Which one of the following unit impulse responses corresponds to a system that does not overshoot when subjected to a unit step input?



B.



3. (30 points) A design point on the root-locus plot for a P-type controller is shown below. A zero is added so that the root-locus passes through this design point. Which of the following represents the correct angle condition for this design?

