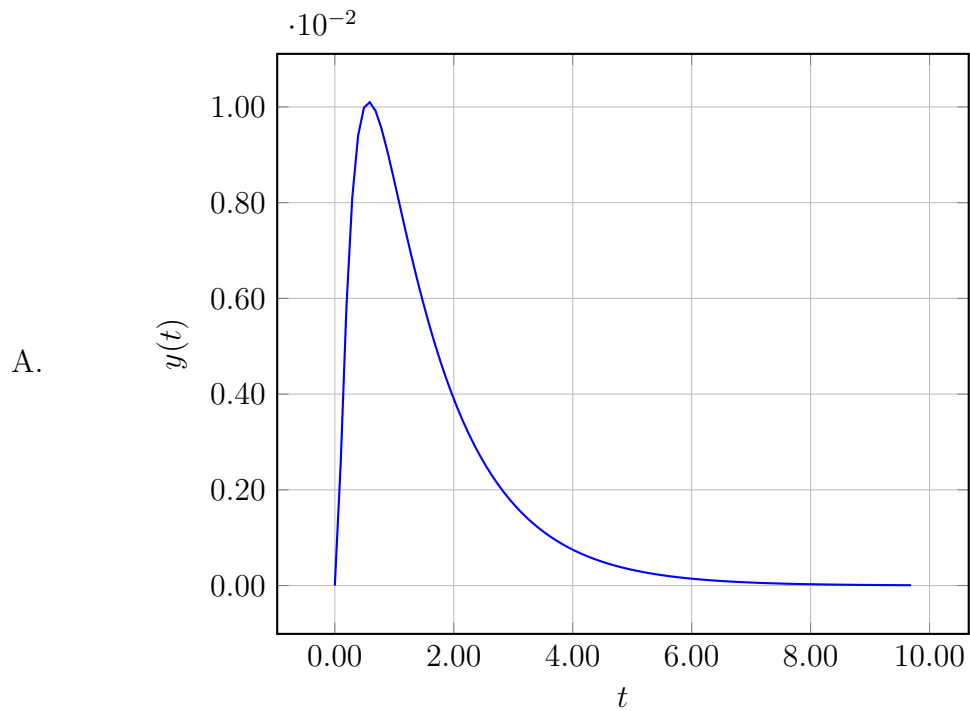


1. (35 points) An open-loop transfer function is given by,

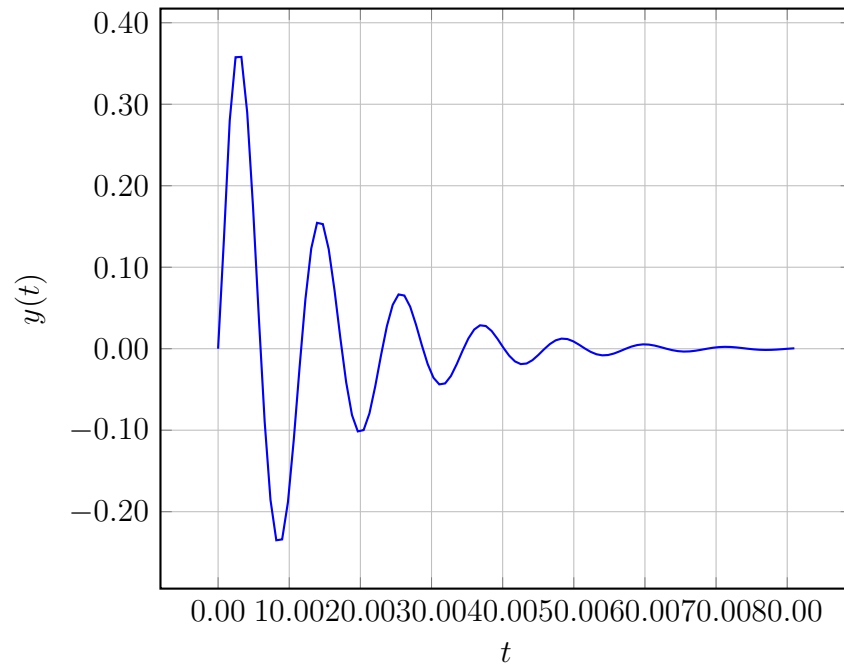
$$G(s) = \frac{1}{s^3 + 2.0s^2 + 3.05554s + 7.05554}$$

Which of the following PI controllers stabilizes the system in a unit-feedback closed-loop configuration?

- A. $F(s) = -9.77779 + \frac{1.1111}{s}$
 - B. $F(s) = -2.6111 + \frac{0.55554}{s}$
 - C. $F(s) = 0.83333 + \frac{1.1111}{s}$
 - D. $F(s) = 0.72221 + \frac{2.6111}{s}$
 - E. $F(s) = -9.66667 + \frac{2.6111}{s}$
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?

