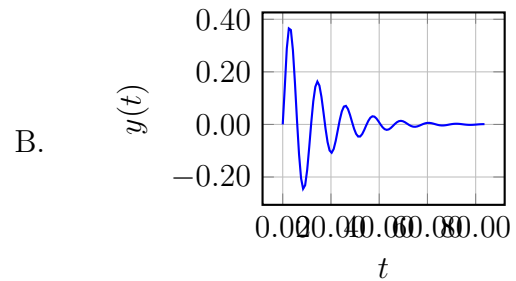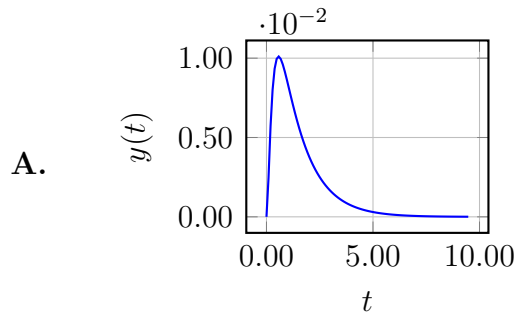1. (35 points) An open-loop transfer function is given as,

$$G(s) = \frac{1}{s^3 + 2.0s^2 + 3.05049s + 7.05049}$$

which of the following PI-controllers stabilizes the system in a closed-loop unit feedback structure?
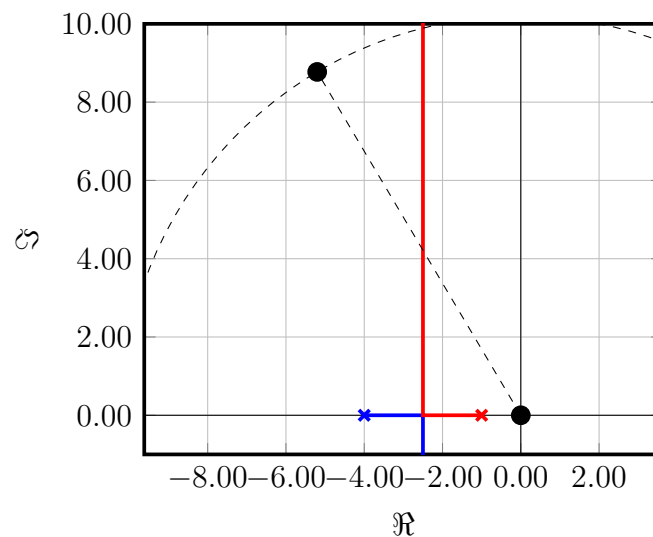
    A. $F(s) = 0.80302 + \frac{1.101}{s}$

    B. $F(s) = -9.79799 + \frac{1.101}{s}$

    C. $F(s) = -9.69698 + \frac{2.601}{s}$

    D. $F(s) = 0.70201 + \frac{2.601}{s}$

    E. $F(s) = -2.601 + \frac{0.55049}{s}$

2. (35 points) Which of the following does not overshoot?
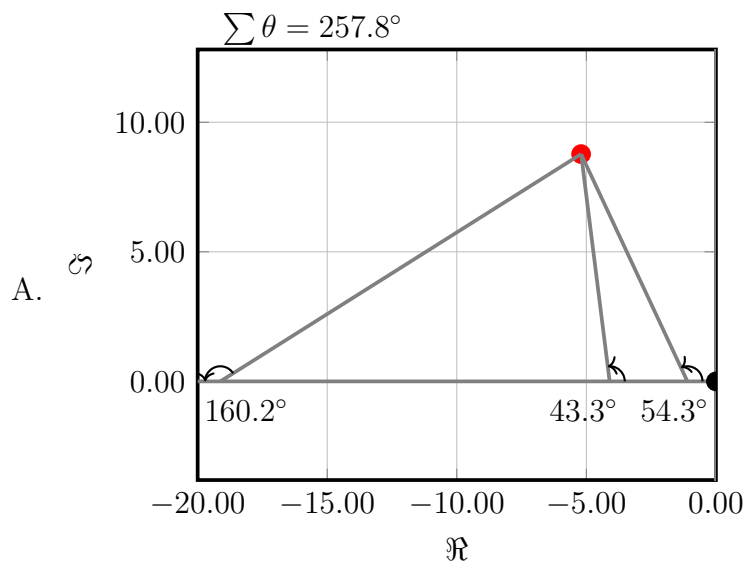
A.

B.

zval:19.12

3. (30 points) Time-domain criteria is give as settling time $t_s = 1\,s$ and overshoot $os = 10\%$. The root-locus plot for the P-type controller design is depicted below.

Upgrading the controller to a PD-type controller which of the following angle conditions need to be used?

A.

$\sum \theta = 257.8°$

$160.2°$ $43.3°$ $54.3°$

B. **1**

Q	A
1	E
2	A
3	B