P – Control with Root Locus

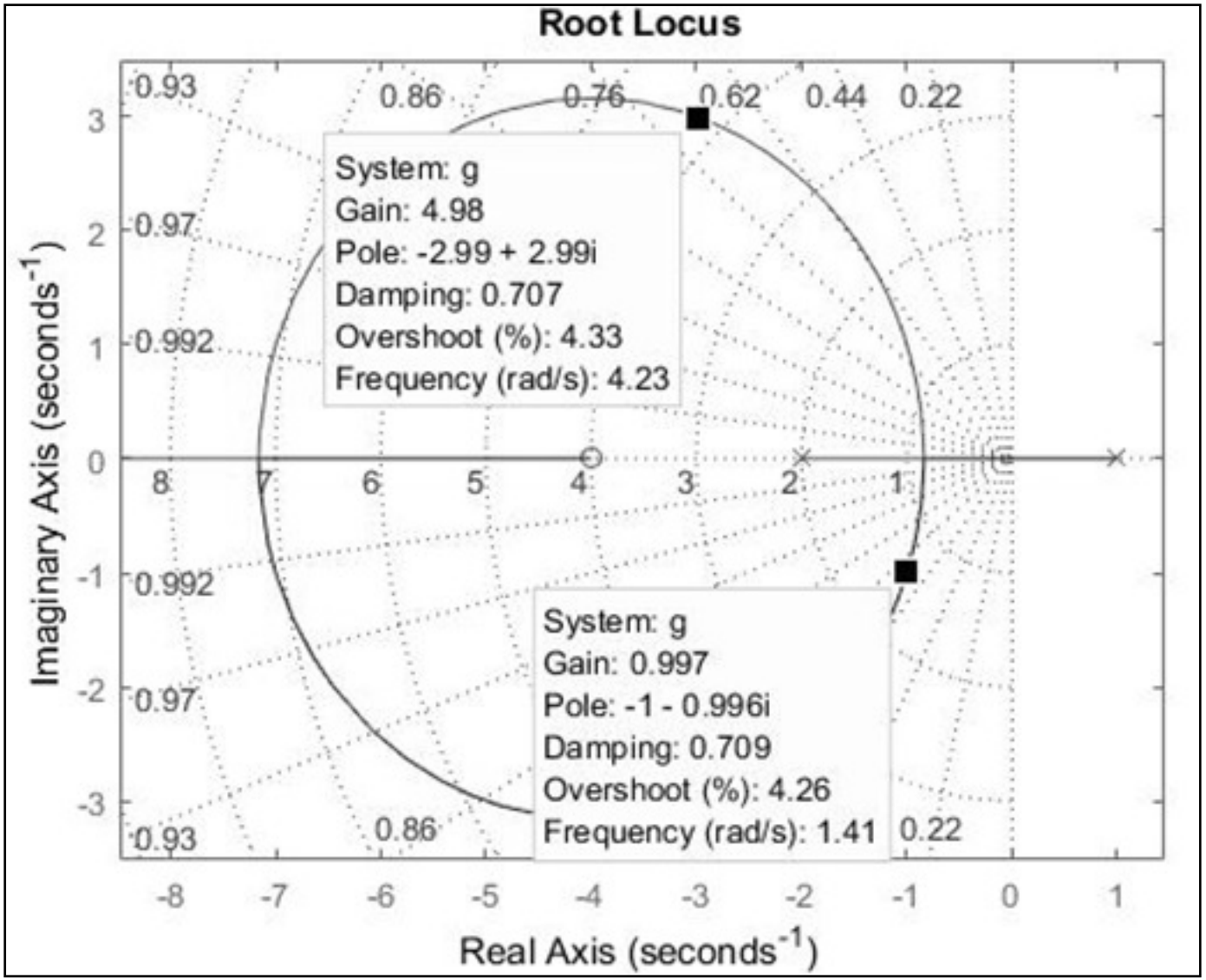
Consider the **plant** given below.

$$G(s) = \frac{K(s+4)}{(s+2)(s-1)}$$

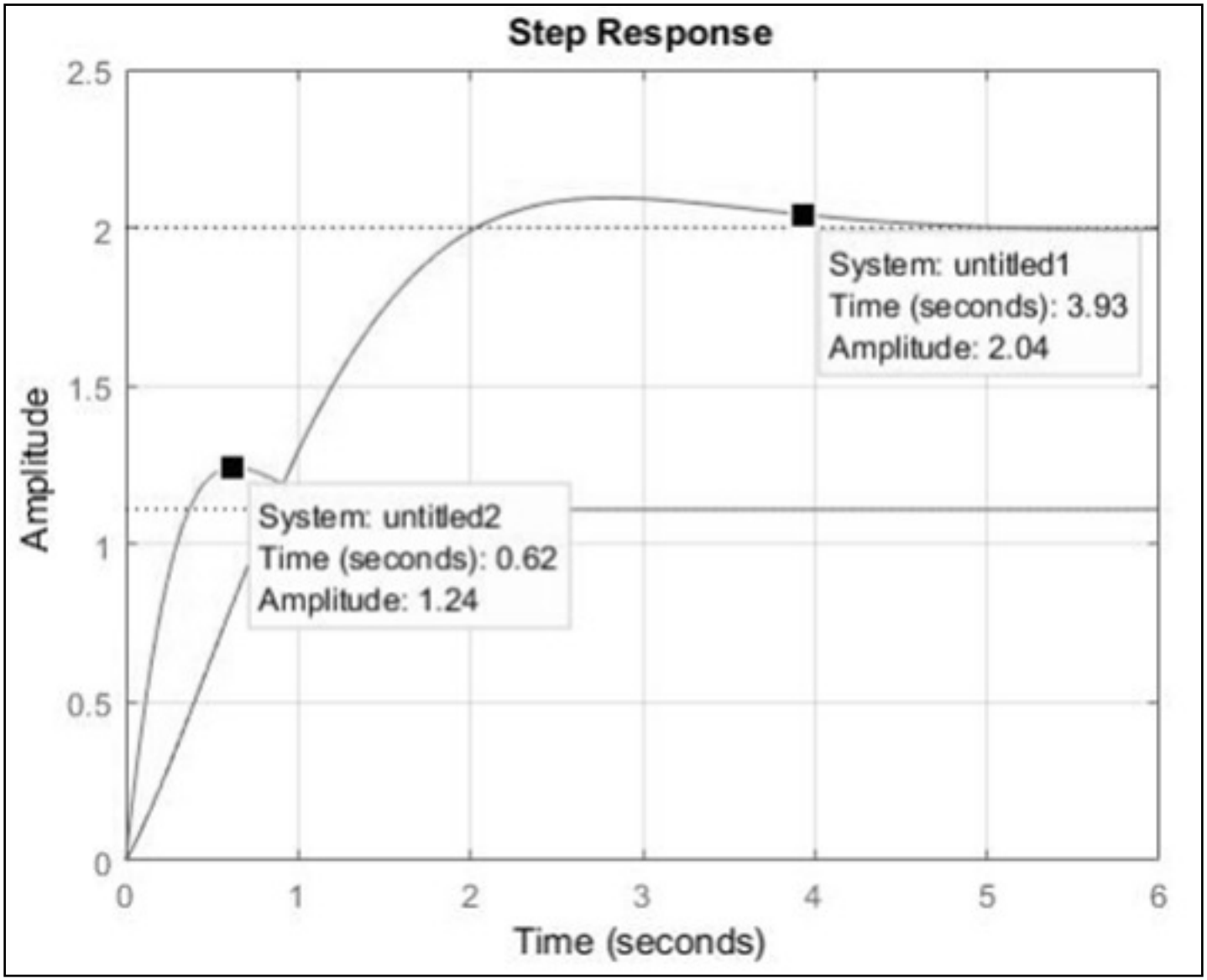
Determine '**K**' using root locus so that $\zeta = 0.707$ and $\mathbf{T_s}$ (2%) < 4sec.

$$\sigma = \frac{4}{T_s} = 1; \quad \omega_n = \frac{\sigma}{\zeta} = 1.414; \quad \omega_d = 1; \quad s_{1,2} = -1 \pm j1$$

Design with Root Locus



Design Verification



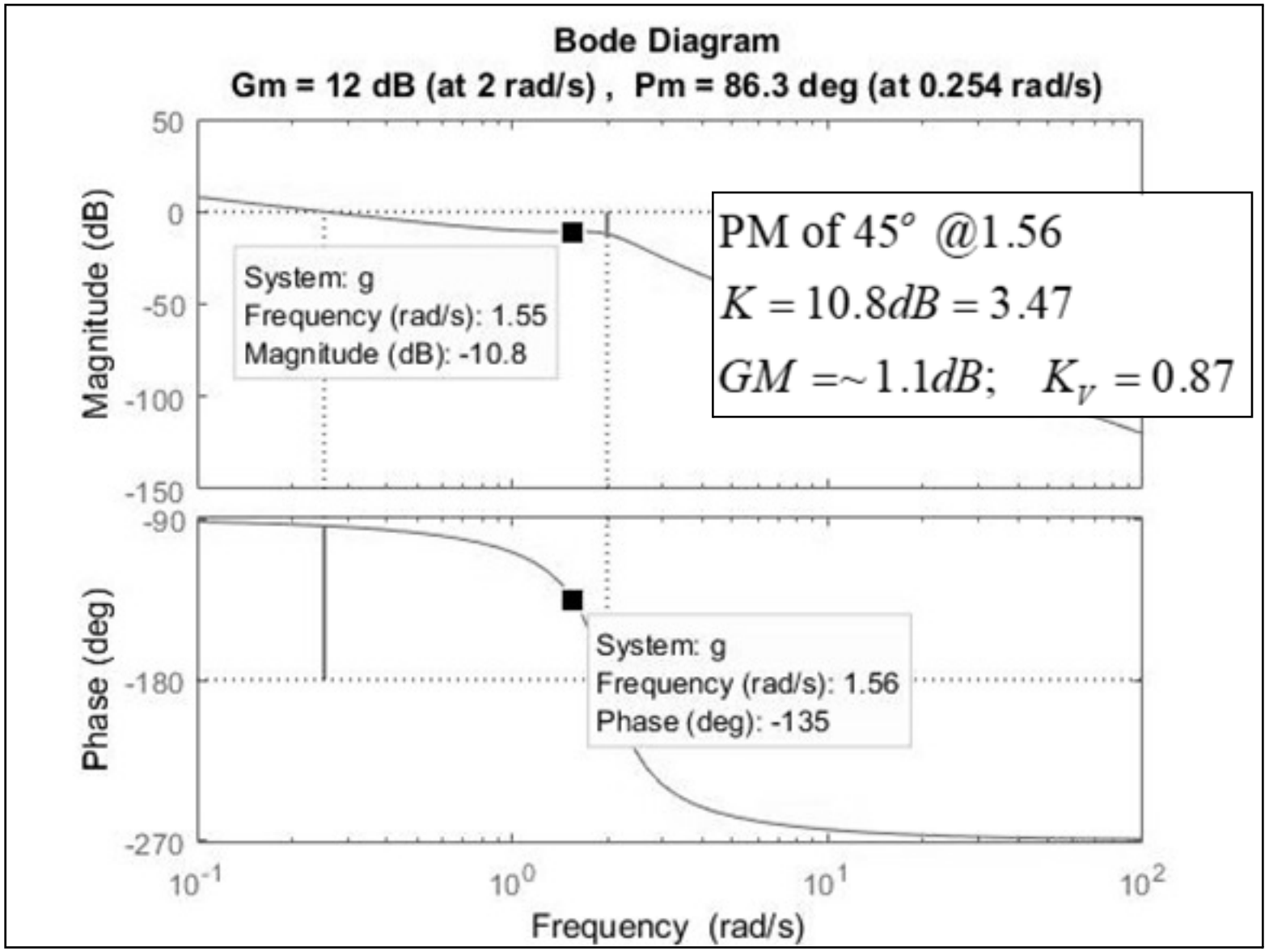
P – Control with Bode Plot

Consider the **plant** given below.

$$G(s) = \frac{K}{s\left(s^2 + s + 4\right)}$$

Determine '**K**', for which the system will have a **phase margin** of 45^o. Also, determine the **gain margin** for this value of 'K' as well as **ramp** error constant.

Design with Bode Plot



Design Verification