Q1

Graphical user interface, chart

Description automatically generated

Bode plot of the system G­cG(s), where Gc = (s+0.1)/s, assuming K = 1

Phase margin of G­c­G(s), = 92.2007

For the resultant phase margin = 45, β= (1-sin45)/(1+sin45) = 0.17157

|G­c(jωmax)| = 1/√(0.17157) = 2.41423 = 7.6556dB

ω­max = 8.6556, 1/T = 3.58523

Glag(s) = 1/β((s+1/T)/(s+1/βT)) = 5.829\*((s+3.58523)/(s+20.8967))

Chart, histogram

Description automatically generated

Bode plot of the compensated system