SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

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Recognized by UGC saravanampatti (post), Coimbatore-641035.

Department of Biomedical Engineering

Course Name: Control Systems

III Year : V Semester

Unit III –Frequency Response

Topic : Bode Plot

Introduction

- The Bode plot or the Bode diagram consists of two plots −
  - Magnitude plot
  - Phase plot
- In both the plots, x-axis represents angular frequency (logarithmic scale). Whereas, y axis represents the magnitude (linear scale) of open loop transfer function in the magnitude plot and the phase angle (linear scale) of the open loop transfer function in the phase plot.
- The magnitude of the open loop transfer function in dB is -
  - $M=20\log|G(j\omega)H(j\omega)|$
- The phase angle of the open loop transfer function in degrees is -
  - $\phi=\angle G(j\omega)H(j\omega)$

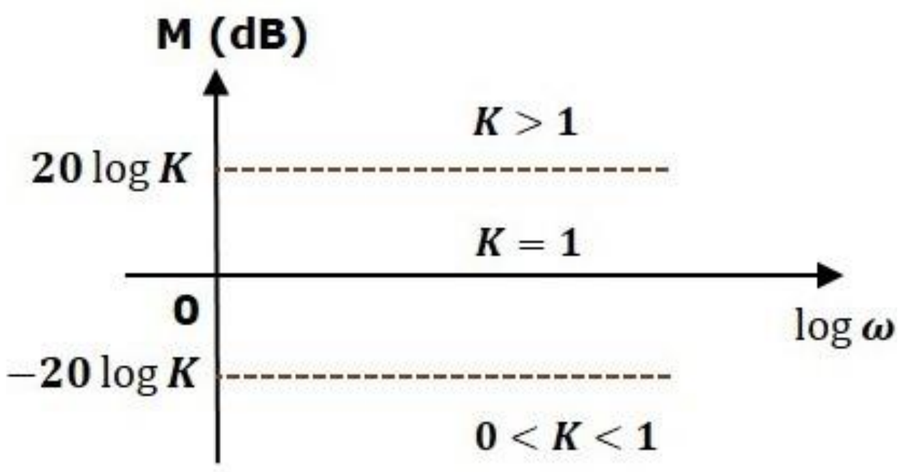
Basics of Bode Plot

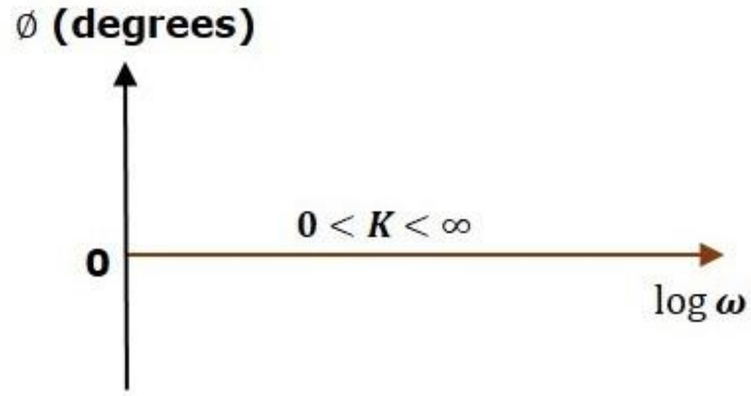
Various factors that appear in a transfer function are

- Constant Gain, K
- Integral Factor, K/s
- Derivative Facor, Ks
- First order factor in denominator
- First order factor in numerator
- Second order factor in denominator
- Second order factor in numerator

Constant Gain

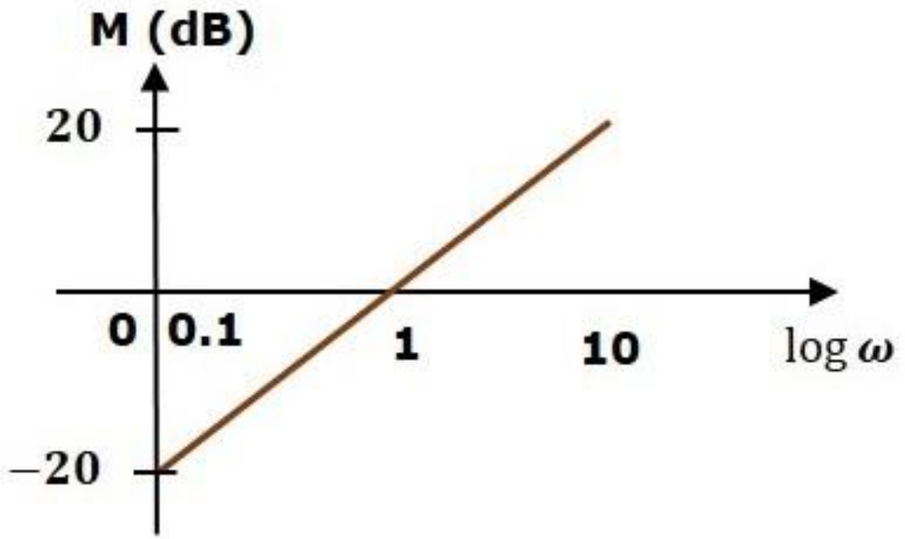
- Consider the open loop transfer function G(s)H(s)=K

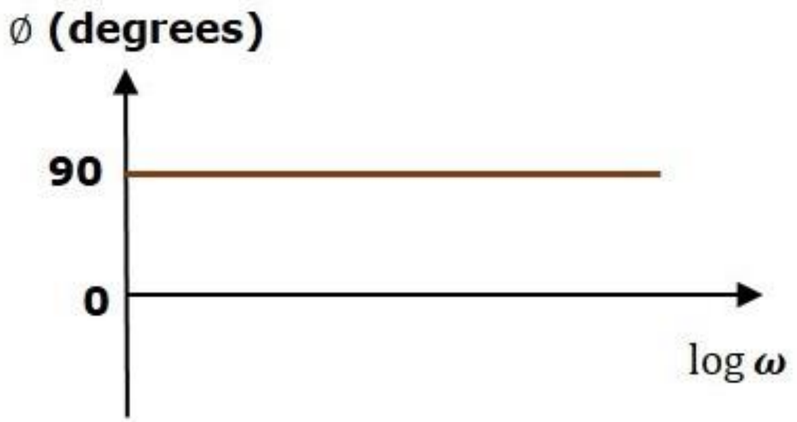




Derivative Factor

- Consider the open loop transfer function G(s)H(s)=K s





First Order Factor

- Consider the open loop transfer function G(s)H(s)=1+sτ