



SNS COLLEGE OF TECHNOLOGY
(An Autonomous Institution)
COIMBATORE-35



UNIT III
POLAR PLOT



INTRODUCTION

- Polar plot is a plot which can be drawn between magnitude and phase. Here, the magnitudes are represented by normal values only.

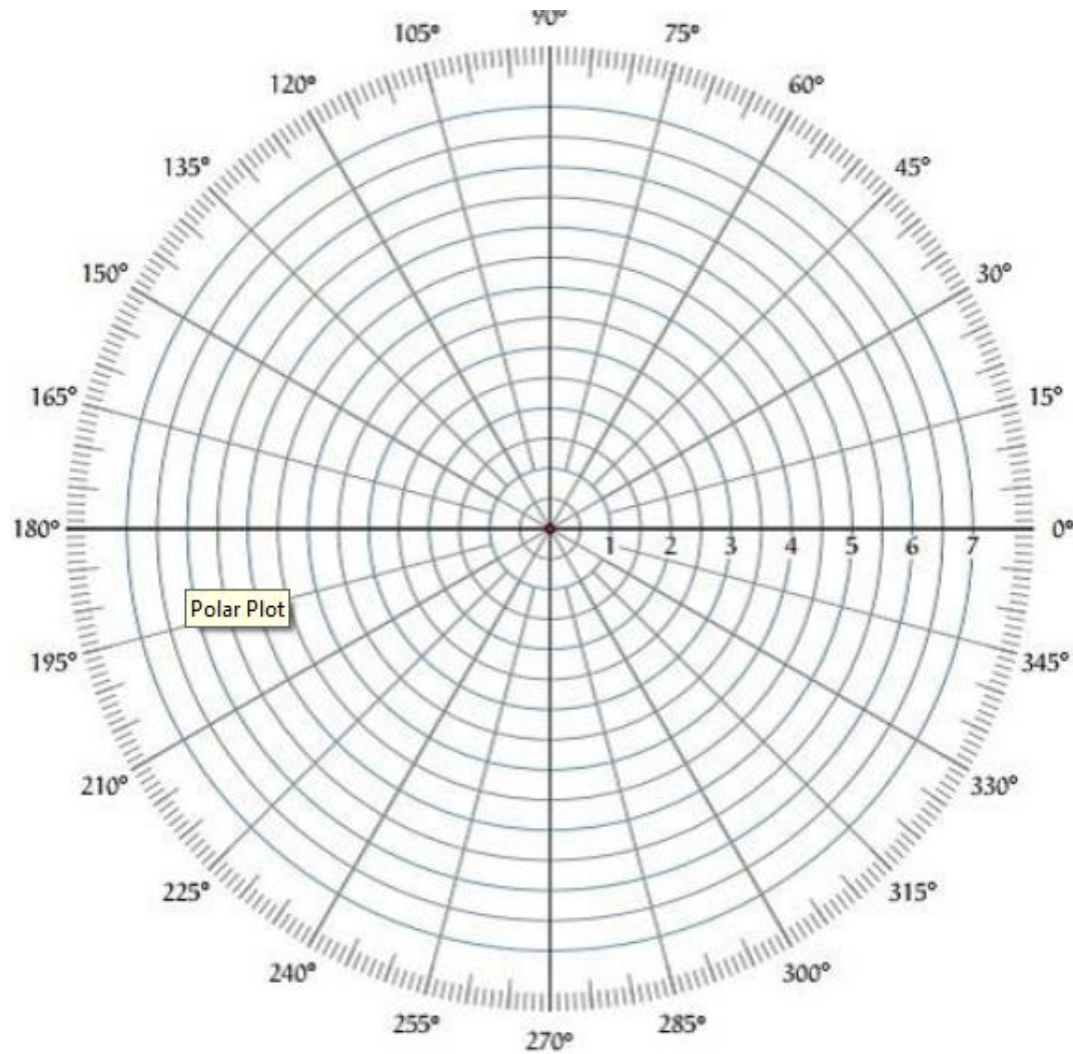
The polar form of $G(j\omega)H(j\omega)$ is

$$G(j\omega)H(j\omega) = |G(j\omega)H(j\omega)| \angle G(j\omega)H(j\omega)$$

- The Polar plot is a plot, which can be drawn between the magnitude and the phase angle of $G(j\omega)H(j\omega)$ by varying ω from zero to ∞ .



INTRODUCTION





POLAR PLOT

- The polar plot can be drawn in a polar graph sheet.
- This graph sheet consists of concentric circles and radial lines.
- The concentric circles and the radial lines represent the magnitudes and phase angles respectively.
- These angles are represented by positive values in anti-clock wise direction.
- Similarly, we can represent angles with negative values in clockwise direction.



POLAR PLOT

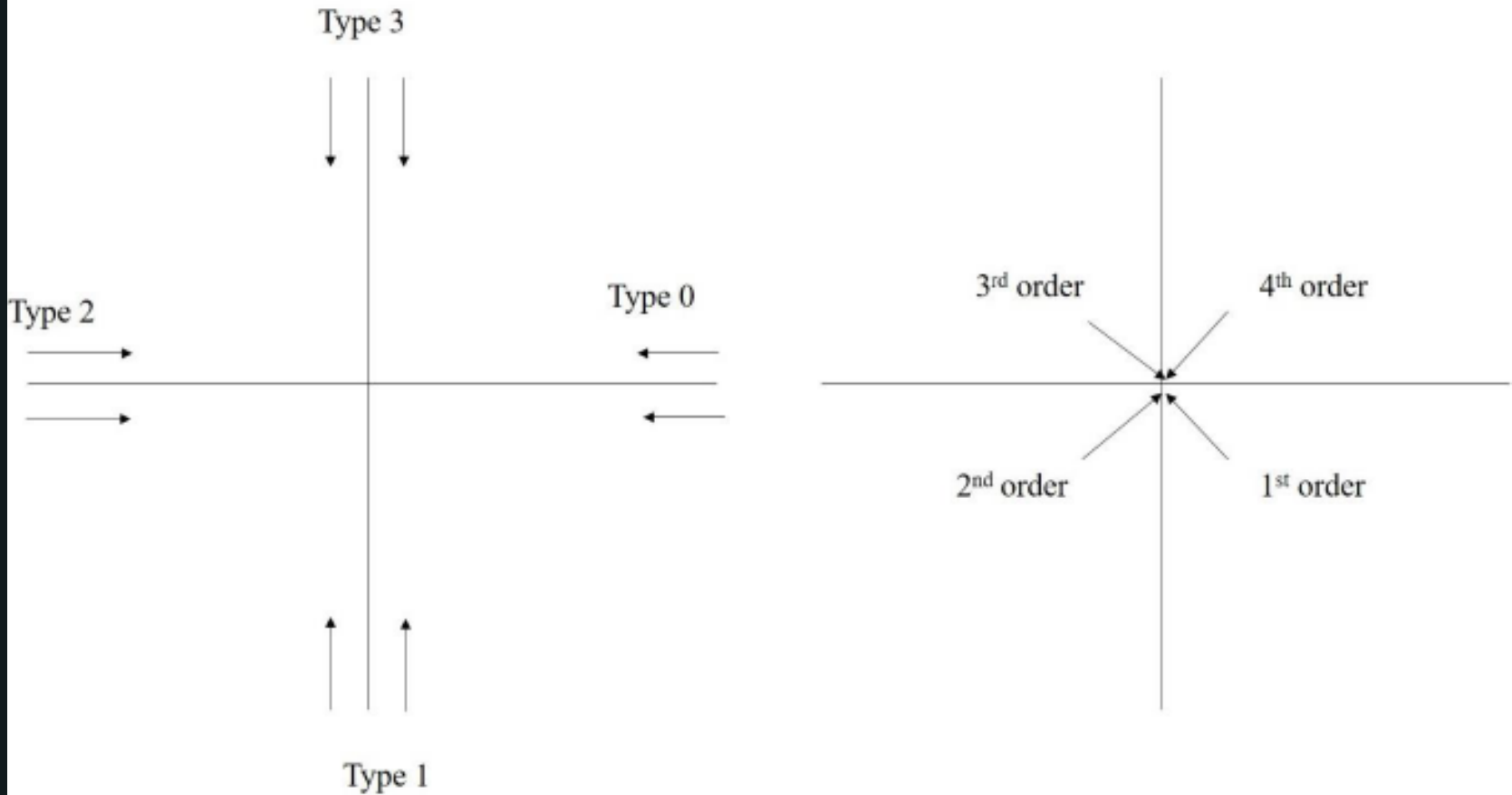
- Alternatively $G(j\omega)$ can be expressed in rectangular coordinates as

$$G(j\omega) = G_R(j\omega) + jG_I(j\omega)$$

- Polar plot starting coordinate and ending coordinate can be easily identified from the knowledge of type number and order of the system.



POLAR PLOT





POLAR PLOT

- **Advantage** of Polar plot is that it depicts the frequency response characteristics of the system over the entire frequency range in a single plot.
- **Disadvantage** is that the plot does not clearly indicate the contribution of each individual factor of the open loop transfer function.



POLAR PLOT

- <https://www.youtube.com/watch?v=stU63ST6ung> –Introduction to polar coordinates Animation video
- <https://www.youtube.com/watch?v=npY6B-xj4gl> - polar frequency response analysis