Polar Plot

It is a graphical representation of the frequency response of a system. It displays the magnitude and phase of the system's transfer function as a function of frequency.

Frequency response

↳ How system responds to different frequencies

Transfer function

↳ mathematical representation that describes the relationship b/w the input and output of the system in the frequency domain

Frequency domain ($j\omega$)

Laplace domain ($\sigma + j\omega$)

Differential equations

⇒ Time Domain

↳ These equations are generated to describe the behaviour of dynamic systems such as mechanical systems, electrical ckts.

These equations typically represents how system variables such as position, velocity, displacement, voltage, current, temperature and pressure change over time in response to the input or disturbances.

eg:- (1) In Simple Mechanical system like a "Mass - Spring - Damper" system, Newton's II law yields a second order ordinary differential equation (ODE) that describes the motion of the mass.

(2) In Electrical System, circuit containing resistors, capacitors inductors, and Kirchoff's law yield differential equations governing the voltage and current relationships in the circuit.

(Graphical explanation)