THE FREQUENCY RESPONSE MODELING OF LINEAR SYSTEMS

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Abstract. *The purpose of this project is to identify a general linear system based on certain sinusoidal inputs so we are able to understand the dynamics of a system. The concept previously mentioned, known as frequency response modeling, has many applications in chemistry, hospital science, mathematics, laser technology, and more. This project uses differential equations and the Laplace transform to model and solve linear systems based on a certain sinusoidal input. This project uses the transfer function of a linear system to create a mathematical identity to create two Bode plots of a general linear system. Complex numbers are also integrated into calculations in order to properly model the linear system and properly identify the linear system. Outcomes of this project include Bode plots of the general linear system that tell us the magnitude of the steady-state sinusoidal output and the phase angle at a certain angular frequency, as well as a method of computing coefficients of a general linear system, thereby leading to its identification. Frequency response modeling of a steady-state system is important as it becomes foundational for the frequency response modeling of changing and dynamic systems.*