NYQUIST STABILITY CRITERION AND NYQUIST PLOTS

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CONTENTS

- INTRODUCTION
- NYQUIST STABILITY CRITERION
- NYQUIST PLOTS
- PHASE & GAIN MARGINS
- APPLICATION IN CONTROL SYSTEM DESIGN
- ADVANTAGES & LIMITATIONS
- CONCLUSION

INTRODUCTION

In this presentation, we will explore the Nyquist Stability Criterion and

its application in analyzing system stability through Nyquist Plots. We

will understand the significance of these tools in evaluating the

stability of control systems.

Nyquist stability criterion

The Nyquist Stability Criterion is a powerful tool in control system analysis. It provides a graphical method to determine the stability of a system based on the encirclement of critical point -1 in the complex plane by the system's transfer function.

Nyquist plots

Nyquist Plots are graphical representations of a system's frequency response. By plotting the real and imaginary parts of the system's transfer function, Nyquist plots provide valuable insights into the system's stability and performance characteristics.

Phase margin and Gain margin

The phase margin and gain margin are key parameters derived from Nyquist plots. They indicate the system's robustness and stability margins. Understanding these margins is crucial for designing stable and reliable control systems.

Application in control system design

- The Nyquist Stability Criterion and Nyquist Plots are fundamental in the design and analysis of control systems. They offer a comprehensive understanding of system behavior and aid in controller design.

- The Nyquist Stability Criterion and Nyquist Plots are widely used in engineering disciplines, including mechanical, electrical, and aerospace engineering. They play a vital role in ensuring the stability and performance of complex control systems in various applications.

Advantages & Limitations

While the Nyquist Stability Criterion offers valuable insights into system stability, it has limitations in analyzing systems with non-minimum phase behavior. Understanding these advantages and limitations is essential for accurate stability analysis.

CONCLUSION

In conclusion, the Nyquist Stability Criterion and Nyquist Plots are indispensable tools for evaluating the stability of control systems. Their graphical nature and ability to provide valuable insights make them essential in the design and analysis of complex engineering systems.

THANK YOU