ECE311: Introduction to Control Systems

Reference Notes

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remark about why $C(s)$ is placed facing the reference and feedback...

Note: This document is not meant to be a comprehensive treatment of the material or contain the complete course notes. The primary purpose of this document is to summarise key concepts along with some analysis and proofs, that can aid in revising the course or serve as a quick reference to a particular topic. Any suggestions or corrections are appreciated and can be sent directly to `pranshu.malik@mail.utoronto.ca`

4 Stability

4.1 Internal Stability

4.2 BIBO Stability

4.2.1 Relationship with internal stability

4.2.2 Routh-Hurwitz Criterion

4.3 The Tracking Problem

4.3.1 Internal Model Principle

4.4 The Stabilization Problem

4.4.1 Nyquist Stability Criterion

5 Frequency Response and Robustness Margins

5.1 Frequency Response

5.2 Bode Plots

5.3 Performance Specifications in the Frequency Domain

5.4 Robustness Margins

5.4.1 Stability Margin, S_m

5.4.2 Phase Margin, ϕ_m

5.4.3 Gain Margin, G_m

5.5 Transient Performance in the Frequency Domain

6 Control Design in Frequency Domain

Control/Compensator

6.1 Lead Compensator

6.2 Lag Compensator

6.3 Lead-lag Compensators and Lead-PI Controllers

Remark on PID

7 Acknowledgements