



Seminar Announcement

June 23rd, 2026, 10:30-11:30, Faculty of Engineering, Room 160/4

MODEL-FREE TUNING OF FEEDBACK CONTROLLER: DERIVED FROM STABILITY MARGINS PERSPECTIVE

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Abstract

Loop shaping and the corresponding amplitude and phase transfer characteristics play one of the most important roles when synthesizing automatic feedback controllers, while different stability margins can be formulated in frequency domain for both robustness and performance properties. For SISO systems of the type one, without explicit model structure and parameter values, the talk will show a novel model-free tuning method proposed for PI-Lead type feedback. We will recall and summarize some relevant properties of a loop transfer function to be shaped via linear feedback of generic type. Then, we will accentuate that the robustness and performance often result directly from the loop characteristics around the crossover frequency and different stability metrics derived based on that. The proposed method roots in the ultimate sensitivity principles and it makes use of some general characteristics of loop shaping. The three-steps tuning procedure, based on the output measurements only, will be explained. Along with general principles and ideas, some illustrative experimental examples will also be shown.

Bio

Prof. Michael Ruderman is full professor in control engineering and mechatronics at University of Agder (UiA), Norway. More information on his academic career and activities can be found at <https://www.uia.no/english/about-uia/employees/michaeru/index.html>

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