

EED604E OPTIMIZATION

Model Reference Adaptive Systems (MARS)

HOMEWORK #3

[Deadline: 17.12.2024 @23.00]

A system is given with the transfer function:

$$G(s) = \frac{b}{s + a}$$

where a and b are unknown positive parameters. The system is controlled by the controller:

$$u = \theta_1 u_c - \theta_2 y$$

The closed-loop control system is required to behave like the reference model, which has the transfer function:

$$G_m(s) = \frac{2}{s + 2}$$

Design a model reference adaptive control system that achieves this desired behavior according to Lyapunov's theory, and analyze the closed-loop system behavior through simulations. (The general form of the relevant algorithm can be found in Astrom Book, Example 5.7).