

Control Systems - Academic Year 2012-2013 - First Test

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Ex-1: Consider the system:

$$\begin{cases} dx/dt = \begin{bmatrix} -2 & 1 \\ 0 & a+12 \end{bmatrix} x + \begin{bmatrix} 2 \\ 0 \end{bmatrix} u \\ y = \begin{bmatrix} 2 & 0 \end{bmatrix} x \end{cases}$$

where a is a real parameter.

- i) Determine all values of the parameter a for which it is possible to stabilize the system through an output dynamic feedback.
- ii) Determine all values of the parameter a for which an output dynamic feedback controller exists so that the eigenvalues of the closed loop system coincide with -2 .
- iii) Determine the controller solving ii).

Ex-2: The observability property. Definitions and formal results.

Available time: 80 minutes

Note: At the end of the exam you can decide either to give us your test or not. If you give us your test, your mark obtained in a previous test, regarding this part of the Control System course, is directly replaced by the mark obtained in the current test.