16.31 Fall 2005 - Homework 4

Prof. Charles P. Coleman

Version: 1.1
Date Out: Sunday 2 October 2005
Date Due: Friday 14 October 2005 2pm

Problem 1

Convert State Space (SS) to Transfer Function (TF):
DeRusso et al., Problem 2.7

Problem 2

Decoupled system:
DeRusso et al., Problem 2.14

Problem 3

Eigenvalue relations:
DeRusso et al., Problem 3.44

Problem 4

Jordan form and generalized eigenvectors:
DeRusso et al., Problem 3.46 (a), (b)

Problem 5

Eigenvalues and eigenvectors:
DeRusso et al., Problem 3.54 (b)

Problem 6

$x(t) = e^{At}x(0)$:
DeRusso et al., Problem 3.67

Problem 7

$y(t) = Ce^{At}x(0)$:
DeRusso et al., Problem 3.68

Problem 8

Application of Cayley-Hamilton!:
DeRusso et al., Problem 3.69 (a), (f), (g)

Problem 9

Properties of e^{At} and A^k:
DeRusso et al., Problem 3.70

Problem 10

Controllability Test: We proved this in class without Cayley-Hamilton. You should now be able
to prove this with Cayley-Hamiltotn:
DeRusso et al., Problem 3.72