

## NPTEL » Advanced Linear Continuous Control Systems: Applications with MATLAB Programming and Simulink

Progress

Mentor

## About the Course Ask a Question Announcements Unit 4 - Week 2 Course outline Assignment 2 How to access the The due date for submitting this assignment has passed. portal As per our records you have not submitted this assignment. MATLAB Onine Access and elements of the row vector **C** are the residues of the system poles Introduction Controllable canonical form Week 1 Observable canonical form Diagonal canonical form Week 2 Jordan canonical form State Space Representation: No, the answer is incorrect. Score: 0 Diagonal Canonical Form (Part-I) Accepted Answers: Diagonal canonical form State Space Representation: Diagonal Canonical Form (Part-II) State Space The eigenvalues of the matrices $A_{CC}$ , $A_{OC}$ , and $A_{DC}$ will be same. Representation: Jordan Canonical Only the eigenvalues of the matrices $A_{CC}$ , and $A_{OC}$ will be same. Form State Space Only the eigenvalues of the matrices $A_{CC}$ , and $A_{DC}$ will be same. Representation: Numerical Examples on State space Only the eigenvalues of the matrices $A_{OC}$ , and $A_{DC}$ will be same. Modelling (Part-I) No, the answer is incorrect. State Space Score: 0 Representation: Accepted Answers: Numerical Examples The eigenvalues of the matrices $A_{CC}$ , $A_{OC}$ , and $A_{DC}$ will be same. on State space Modelling (Part-II) The Jordan canonical form of state model is applicable when Quiz : Assignment 2 all poles are real and distinct Solution For some of the poles are real and some of the poles are repeated Assignment 2 all poles are complex and distinct State model is non-square Week 3 No, the answer is incorrect. Week 4 Score: 0 Accepted Answers: some of the poles are real and some of the poles are repeated Week 5 4) Which of the following statement is false regarding the state variable approach? Week 6 It is a time domain approach Week 7 State variables need not be measurable State variables cannot be feedback Week 8 Design by using this approach yields optimal solutions DOWNLOAD VIDEOS No, the answer is incorrect. Score: 0 Accepted Answers: FEEDBACK LINK State variables cannot be feedback Simulink Tutorial Consider the system given by Text Transcripts The state-space representation of this system in Jordan canonical form is given by $\dot{x} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & -3 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} u \; ; \; y = \begin{bmatrix} 10/3 & 20/9 & -20/9 \end{bmatrix} x$

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Due on 2019-08-21, 23:59 IST.
  1) In which canonical form representation, the elements of the column vector B are all unity and the
                                                                                                                                                              1 point
  2) Consider a system with system matrices as A_{CC}, A_{OC}, and A_{DC} in controllable canonical,
                                                                                                                                                              1 point
observable canonical, and diagonal canonical forms respectively. Choose the correct statement
                                                                                                                                                              1 point
                                                                                                                                                              1 point
                                                                                                                                                             1 point
     \dot{x} = egin{bmatrix} 0 & 1 & 0 \ 0 & 0 & 0 \ 0 & 0 & -3 \end{bmatrix} x + egin{bmatrix} 0 \ 1 \ 1 \end{bmatrix} u \; ; \; y = \begin{bmatrix} 10/3 & -20/9 & 20/9 \end{bmatrix} x
     \dot{x} = egin{bmatrix} 0 & 1 & 0 \ 0 & 0 & 1 \ 0 & 0 & -3 \end{bmatrix} x + egin{bmatrix} 0 \ 1 \ 1 \end{bmatrix} u \; ; \; y = [-10/3 & 20/9 & 20/9] \, x
     \dot{x} = \left[egin{array}{ccc|c} 0 & 1 & 0 \ 0 & 0 & 1 \ 0 & 0 & -3 \end{array}
ight] x + \left[egin{array}{ccc|c} 1 \ 1 \ 1 \end{array}
ight] u \; ; \; y = \left[\,10/3 & 20/9 & -20/9\,
ight] x
   No, the answer is incorrect.
   Accepted Answers:
  \dot{x} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & -3 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} u \; ; \; y = \begin{bmatrix} 10/3 & 20/9 & -20/9 \end{bmatrix} x
  6) In which of the canonical form representations of the state model, the diagonal elements of the system 1 point
matrix A are the eigen-values of the system

    Controllable canonical form and observable canonical form.

    Controllable canonical form and diagonal canonical form

    Diagonal canonical form and observable canonical form

    Diagonal canonical form and Jordan canonical form

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   Diagonal canonical form and Jordan canonical form
  7) In which of the canonical form representations of the state model, all elements except the last row
                                                                                                                                                             1 point
elements and the super-diagonal elements are zeros

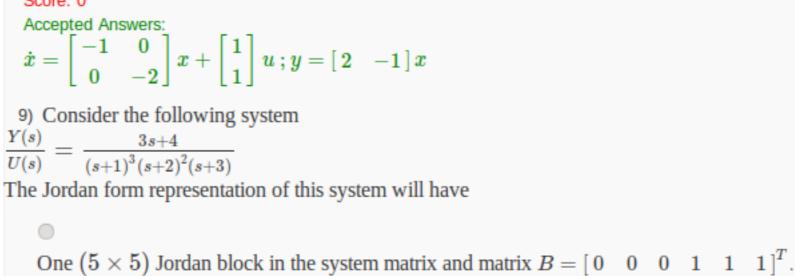
    Controllable canonical form

    Observable canonical form

    Diagonal canonical form

    Jordan canonical form

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   Controllable canonical form
  8) A system is described by the differential equation \ddot{y} + 3\dot{y} + 2y = \dot{u} + 3u, all the initial conditions
                                                                                                                                                              1 point
being zero. The diagonal canonical form representation of the system is given by
     \dot{x} = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u \; ; y = \begin{bmatrix} -2 & 1 \end{bmatrix} x
     \dot{x} = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u ; y = \begin{bmatrix} 2 & -1 \end{bmatrix} x
    \dot{x} = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u ; y = \begin{bmatrix} -2 & 1 \end{bmatrix} x
     \dot{x} = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u \; ; y = \begin{bmatrix} 2 & -1 \end{bmatrix} x
   No, the answer is incorrect.
   Accepted Answers:
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No, the answer is incorrect.

One  $(3 \times 3)$  and one  $(2 \times 2)$  Jordan blocks in the system matrix and matrix  $B = \begin{bmatrix} 0 & 0 & 0 & 1 & 1 & 1 \end{bmatrix}^T$ . One  $(5 \times 5)$  Jordan block in the system matrix and matrix  $B = \begin{bmatrix} 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}^T$ .

Score: 0 Accepted Answers: One  $(3 \times 3)$  and one  $(2 \times 2)$  Jordan blocks in the system matrix and  $matrix B = \begin{bmatrix} 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}^T.$ 10)Consider the following system

One  $(3 \times 3)$  and one  $(2 \times 2)$  Jordan blocks in the system matrix and matrix  $B = \begin{bmatrix} 0 & 0 & 1 & 1 \end{bmatrix}^T$ .

1 point

1 point

 $\dot{x} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 2 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} u \; ; \; y = \begin{bmatrix} 40/3 & 15 & 5/3 \end{bmatrix} x$ 

The state-space representation of this system in diagonal canonical form is given by

$$\dot{x} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 3 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} u \; ; \; y = \begin{bmatrix} 40/3 & 15 & -5/3 \end{bmatrix} x$$
 
$$\dot{x} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -3 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} u \; ; \; y = \begin{bmatrix} -40/3 & -15 & 5/3 \end{bmatrix} x$$
 
$$\dot{x} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -3 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} u \; ; \; y = \begin{bmatrix} 40/3 & -15 & 5/3 \end{bmatrix} x$$
 No, the answer is incorrect. Score: 0 Accepted Answers: 
$$\dot{x} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -3 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} u \; ; \; y = \begin{bmatrix} 40/3 & -15 & 5/3 \end{bmatrix} x$$