

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

M.Tech I Year I Semester (R14) Supplementary End Semester Examinations – August 2018

MODERN CONTROL THEORY

(Solar Power Systems)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either Part A or Part B only. Q.no 6 which is a case study is compulsory.

Q.1(A) Describe the significant of minimal realization process in SISO and SIMO Transfer Functions. 12M

OR

Q.1(B) Obtain the state model for the transfer function $\frac{c(s)}{R(s)} = \frac{1}{s^2+2s+3}$ 12M

Q.2(A) Explain the different techniques for pole assignment by state feedback. 12M
Consider a linear system described by the T.F $\frac{y(s)}{u(s)} = \frac{10}{s(s+1)(s+2)}$ Design a feedback controller with a state feedback so that the closed loop poles are placed at -2, -1±j1.

OR

Q.2(B) Describe the following state space representation methods. 12M
a. Controllable canonical form b. Observable canonical form

Q.3(A) Explain the procedure to analysis the stability of non-linear system with the help of describing function. 12M

OR

Q.3(B) i. Explain the properties of state transition matrix. 6M
ii. Explain the stability analysis of non Linear systems using phase trajectories. 6M

Q.4(A) Describe the solution of algebraic Riccati equation using Eigen values and Eigen vectors. 12M

OR

Q.4(B) i. Explain the Model decomposition and Decoupling by state feedback. 6M
ii. Explain briefly about the controller design using output feedback. 6M

Q.5(A) i. State and explain the Liapunov stability problem. 6M
ii. Consider the second order system described by 6M

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

The equilibrium state is the origin. Determine the stability of the system using Liapunov's method.

OR

Q.5(B) Write short notes on (i) Lyapunov stability analysis (ii) Popov's stability analysis. 12M

END

Hall Ticket No:

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Question Paper Code: 14VES11T04

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

M.Tech I Year I Semester (R14) Supplementary End Semester Examinations – Aug 2018

(Regulations: R14)

ANALOG & DIGITAL IC DESIGN

(VLSI & Embedded Systems)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

In Q.no 1 to 5 answer either Part-A or B only

Q.1(A) Explain the working principle of active biased Common Gate amplifier with relevant diagrams and expressions. 12M

OR

Q.1(B) How Open Circuit time constant method can be used in common source FET amplifier and derive the expression for Voltage gain. 12M

Q.2(A) Write short notes on Two stage CMOS Op-Amp with neat sketches. 12M

OR

Q.2(B) What are the various compensation techniques used in Op-Amps? Explain. 12M

Q.3(A) How high Swing current mirrors are used in Analog ICs? Explain. 12M

OR

Q.3(B) Write about the principle of operation of Folded Cascode Op-Amp. 12M

Q.4(A) Design the second-order MASH modulator using first-order modulators and describe the relations between them. 12M

OR

Q.4(B) What is OTA? Explain about the working principle of it. 12M

Q.5(A) Implement various ALU functions with an adder circuit. 12M

OR

Q.5(B) Write Short notes on 12M

(i) Carry Look Ahead adder (ii) Serial Parallel multiplier

***** END*****