Code No: D5102 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH II SEMESTER EXAMINATIONS, APRIL/MAY 2012
ADVANCED PROCESS CONTROL
(CHEMICAL ENGINEERING)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks

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1.a) Discuss in detail about the Nyquist stability criterion with the help of graphs.
b) Write about stability criterion in the inverse plot.

2. Discuss in detail about the construction of dynamic matrix control based on step-response model

3. For the two-tank liquid-level system shown in fig 1, obtain the state-space description as expressed by $X = Ax + Bu$ and $y=cx$ when phase variables are selected for the state variables. The output y of interest is the level in tank 2. Note that streams enter both tanks.

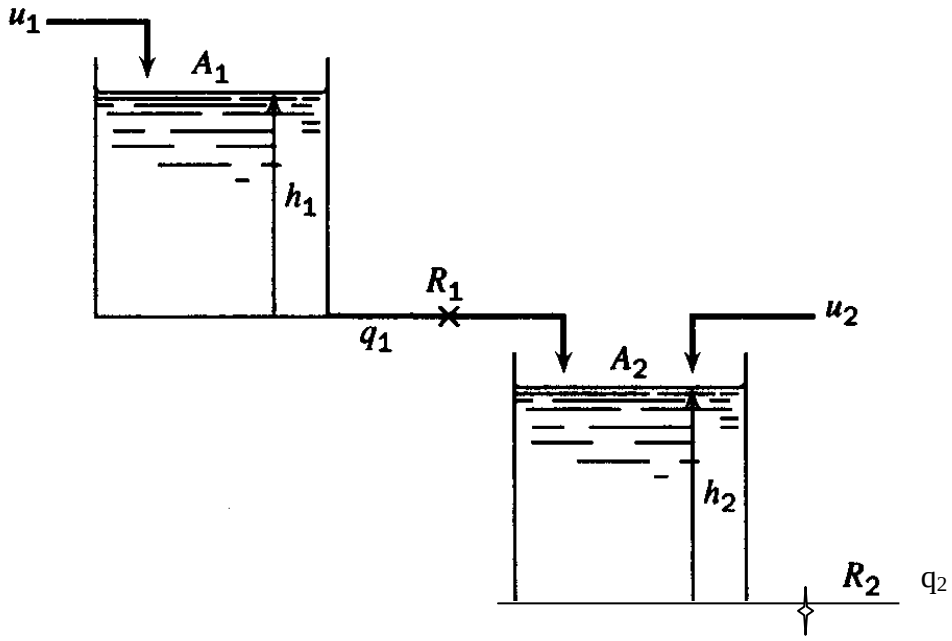

Fig 1

4.a) Explain in detail about the RGA for two input and two outputs.
b) Discuss about multivariable controller.

5. Use pulse transfer function for the following diagram in which a triangular wave signal enters the sampler. By using C*(Z) = F(z)G(z) equation plot* the continuous response of c(t) between sampling instants. Here G(S) = 1/ (ts+1).

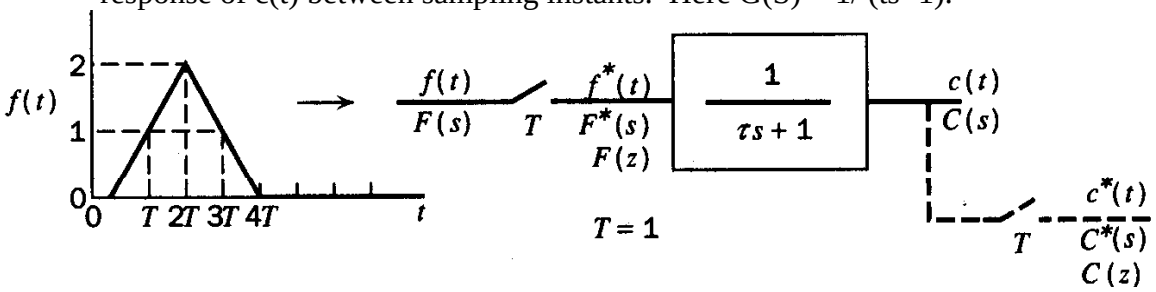

Fig-2

6. Discuss the following
   a) Discuss about feed forward and cascade control
   b) Selective and split range control

7. Discuss about the following
   a) Transfer function matrices
   b) Decouplers
   c) Properties of z-transforms

8. Explain about the following
   a) Conversion of continuous to discrete models
   b) Selection of state space variables
   c) Closed loop frequency response.

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