

Subject Code: H2103/R13

M. Tech –II Semester Regular/ Supply Examinations, October, 2015

FINITE ELEMENT METHOD

(Common to TE, MD, MED, CAD/CAM, AMS and AM&MSD)

Time: 3 Hours

Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1. Construct the weak form and the quadratic potential if it exists for the following problem

Longitudinal deformation of a bar with an end spring:

$$-\frac{d}{dx} \left(a \frac{du}{dx} \right) = q \quad \text{for } 0 < x < L$$

$$u(0) = 0, \quad \left(a \frac{du}{dx} + ku \right) \Big|_{x=L} = P$$

where a and q are functions of x , and k and P are constants.

2. Compute the coefficient matrix and the right-hand side of the N-parameter Rayleigh-Ritz

approximation of the equation $-\frac{d}{dx} \left[(1+x) \frac{du}{dx} \right] = 0 \quad \text{for } 0 < x < 1$

$$u(0) = 0, \quad u(1) = 1$$

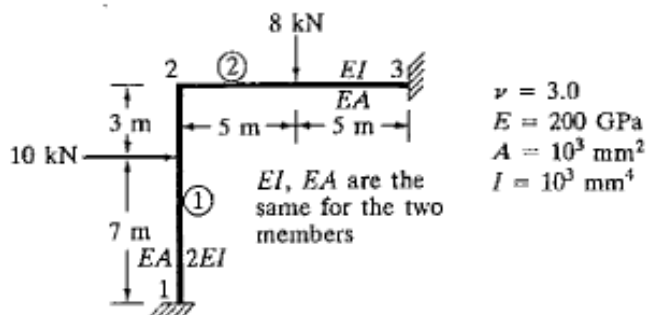
Use algebraic polynomials for the approximation functions, Specialize your result for $N=2$ and compute the Ritz coefficients.

3. For the problem shown

(a) Give the transformed element matrices

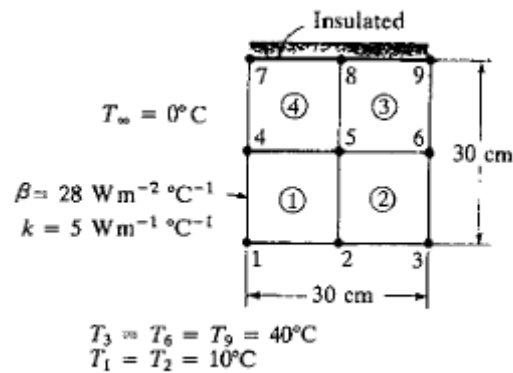
(b) Assembled element matrices

(c) The condensed matrix equations for the unknown generalized displacements and forces.

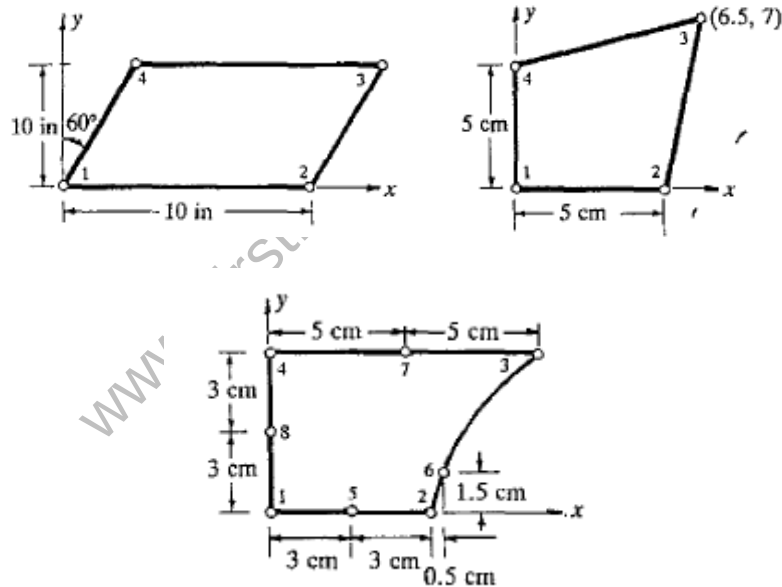


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4. Write the finite element equations for the unknown temperatures of the following problem



5. Determine the smallest natural frequency of a beam with damped ends, and a constant cross-sectional area A , moment of inertia I , and length L . Use the symmetry and two Euler – Bernoulli beam elements in the half-beam
6. Determine the jacobian and the transformation equations for the following



7. The transverse displacement of a triangular bending element (w) is expressed as a complete third degree polynomial in x and y . The nodal degrees of freedom are the displacements and the partial derivatives. Determine whether the convergence requirements are satisfied by this model.
8. a) Discuss in detail serendipity and Lagrange interpolation functions
 b) Explain how boundary conditions are handled in FEM
 c) Derive the characteristic matrix for two dimensional fin

Subject Code: H4303/R13

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DIGITAL CONTROLLERS

(Common to PE, P&ID, PE&ED, PE&D, EM&D)

Time: 3 Hours

Max Marks: 60

Answer any FIVE questions

All questions carry EQUAL marks

- 1 a Define Micro controller, Explain the historical background of Micro controllers [6]
b With a neat sketch Explain about PIC 16C6X/7X [6]
- 2 a Define DSP core and explain about code generation of DSP core [6]
b What is meant by Mapping, Explain about Mapping external devices to the C2xx core [6]
- 3 a Define Interrupt, Discuss about Interrupt Hierarchy [6]
b Explain about Interrupt Control Registers [6]
- 4 a Explain about Event manager in the DSP [6]
b Explain about the general Event Manager Information [6]
- 5 a Define FPGA ,Distinguish between CPLD and FPGA [6]
b Explain about Configurable logic block(CLB) and input/output block(IOB) [6]
- 6 Explain about
a) The PIC 16C61/71 Timers
b) PIC 16C71 Analog to Digital Converter(ADC) [6]
- 7 a Define memory, Explain the different types of memories [6]
b Describe the Instruction set of C2xx DSP core [6]
- 8 Write a short notes on
a) HDL programming
b) Programmable Interconnect Point (PIP) [6*2=12]

Subject Code: H4502/R13

M. Tech –II Semester Regular/ Supply Examinations, October, 2015

IMAGE AND VIDEO PROCESSING

(Com to SSP, DIP, CE&SP, IP, C&SP, SP&C, DECS, E&CE, DECE and CS)

Time: 3 Hours

Max Marks: 60

Answer any FIVE questions

All questions carry EQUAL marks

1. a) What is KL transform? What are the disadvantages of KL transform? Explain.
b) Explain about Haar transform
2. a) Which criteria highlight certain features of the interest? Explain about it.
b) Explain about the Image file formats.
3. a) What is high pass filter? Discuss about butter worth high pass filter.
b) What is histogram matching? discuss
4. a) Differentiate between linear and nonlinear image restoration techniques.
b) Discuss about Blind deconvolution.
5. What is clustering? Explain about different clustering techniques with examples.
6. a) What is redundancy in images? Discuss about Shannon Fano coding.
b) Discuss about wavelet based image compression.
7. a) Explain about Photometric image formation.
b) How sampling is done for video signals.
8. Explain about the following terms
 - a) Predictive coding
 - b) Region based motion estimation
 - c) Hadamard transformation

Subject Code: H5804/R13

M. Tech –II Semester Regular/ Supply Examinations, October, 2015

OBJECT ORIENTED ANALYSIS AND DESIGN

(Computer Science & Engineering)

Time: 3 Hours

Max Marks: 60

Answer any FIVE questions

All questions carry EQUAL marks

- 1 a) Define software architecture. Explain the 4+1 view model of systems architecture. [6]
b) Explain the various relationships with UML notation. [6]
- 2 a) Enumerate the steps to model different views of a system. [6]
b) How do you inter relate interfaces, types and roles? [6]
- 3 a) Enumerate the steps to forward engineer a class diagram. [6]
b) Enumerate the steps to model logical database schema. Give all example class diagrams. [6]
- 4 a) Consider modeling a student information system. Consider the use case “student registers for a course”. Draw a sequence diagram and explain briefly. [6]
b) Explain about collaboration diagrams. How are they contrasted with sequence diagrams? What is semantic equivalence with interaction diagrams? [6]
- 5 a) Draw a use case diagram that depicts the context of a credit card validation system. Explain briefly. [6]
b) Explain the various relationships possible among use cases. Illustrate in UML notation. [6]
- 6 a) What are swimlanes? Explain with an activity diagram. [6]
b) What are the various parts of a state? Explain briefly. [6]
- 7 a) Describe the various parts of a transition. [6]
b) Explain in detail about the extensibility mechanisms in UML. [6]
- 8 a) Define component. What are the differences between components and classes? How are component and interface related? [6]
b) Enumerate the steps to model an executable release. Illustrate with UML diagram. [6]
