

Advanced Fracture and Structural Mechanics

2 units (selection)

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Target To understand method of matrix displacement analysis of plane framed structures which is widely used as a suitable method for computer programming.

Outline First, method of matrix displacement analysis of plane framed structures is explained. Next, some problems are given for exercises in analysis of them. Finally, term examination is set. This class is a seminar type using textbook written in English.

Style Lecture

Keyword *framed structure, matrix displacement method, plane frame, elastic analysis, English textbook*

Fundamental Lecture “**Structural Mechanics 1**”(1.0), “**Structural Mechanics 3**”(1.0), “**Applied Structural Mechanics**”(0.8), “**Structural Analysis with Exercise**”(0.8)

Relational Lecture “**Advanced building construction**”(0.5), “**Advanced Civil and Environmental Engineering Seminar**”(0.5)

Requirement Students are required to have a good understanding of undergraduate-level structure mechanics.

Notice Students are required to do two hours preparation and two hours review for each lesson.

Goal To understand method of matrix displacement analysis of plane frames

Schedule

1. Guidance/A few historical remarks(pp.1-10)
2. Basic considerations of structural analysis 1(pp.11-16)
3. Basic considerations of structural analysis 2/Determinate and indeterminate structures(pp.16-21)
4. Methods of analysis (pp.21-26)
5. Displacement method/Stiffness matrix of a bar element subjected to axial force(pp.26-33)
6. Bar structure stiffness matrix(pp.33-39)
7. Some properties of stiffness matrices/Stiffness matrix of a bar element subjected to torsion(pp.39-44)
8. Stiffness matrix of a beam element (pp.44-47)
9. Assembly of the structure stiffness matrix by the direct stiffness method 1(pp.47-54)

10. Assembly of the structure stiffness matrix by the direct stiffness method 2(pp.54-59)

11. Symmetrical geometry(pp.59-64)

12. Further remarks on prescribed displacements(pp.64-70)

13. Problem exercises(pp.71-72)

14. Problem exercises(pp.72-73)

15. Term examination

16. Restoration of answer papers and comments

Evaluation Criteria Term examination and report are marked out of 60 and 40 respectively and those marks are summed up. The passing mark is 60.

Textbook Matrix and finite element displacement analysis of structures, D.J. DAWE, Clarendon press, Oxford, 1984

Reference To be introduced in the class

Contents <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216812>

Student Able to be taken by only specified class(es)

Contact

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