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MATRIX ANALYSIS
OF
DISCRETE ELASTIC SYSTEMS

COURSE HELD AT THE DEPARTMENT
OF MECHANICS OF SOLIDS
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P R E F A C E

The analysis of discrete elastic systems (structures) is presented. Whether a system is discrete to begin with or is discretized in a certain fashion (idealization of continuum by finite elements), its analysis within the framework of matrix algebra has received ever-increasing popularity after the middle of this century. In order to prepare the audience to think in terms of entities, we have introduced a brief review of matrix algebra and coordinate transformations in Chapter 1. Thereafter, we go into the analysis of structures using stiffness and flexibility methods which are derived from Castigliano's first and second theorems respectively. Through such theorems, we clearly see the duality of these two well-known methods.

Since the purpose of analysis is to achieve an optimal design, the modification of systems after each analysis is very common. Therefore, in Chapter 4, we discuss how to modify the method of analysis in order to take advantage of the previous analysis. Such a feature, which did not exist in pre-matrix methods, allows a considerable amount of saving in machine time and labor.

Finally, once the analyst knows well how to play the game (analysis), he then looks into possibilities of playing the game more efficiently. Therefore, the analysis of large systems by the Method of Tearing and their replacement by equivalent systems are presented in Chapters 5 and 6 respectively.

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H. Kardestuncer

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