Alexandrov

Elastic/Plastic Discs Under Plane Stress Conditions

This Volume presents a unified approach to calculate the plane stress distribution of stress and strain in thin elastic/plastic discs subject to various loading conditions. There is a vast amount of literature on analytical and semi-analytical solutions for such discs obeying Tresca's yield criterion and its associated flow rule. On the other hand, most of analytical and semi-analytical solutions for Mises yield criterion are based on the deformation theory of plasticity. A distinguished feature of the solutions given in the present volume is that the flow theory of plasticity and Mises yield criterion are adopted. The solutions are semi-analytical in the sense that numerical methods are only necessary to evaluate ordinary integrals and solve transcendental equations. The book shows that under certain conditions solutions based on the deformation and flow theories of plasticity coincide. All the solutions are illustrated with numerical examples. The goal of the book is to provide the reader with a vision and an insight into the problems of analysis and design of elastic/plastic discs. The limitations and the applicability of solutions are emphasized. The book is written for engineers, graduate students and researchers interested in the development of techniques for analysis and design of thin elastic/plastic discs.
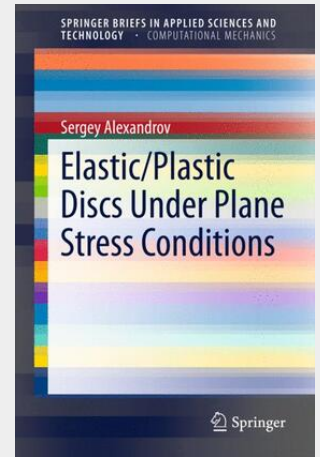
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