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Nota di contenuto	Cover; Title Page; Contents; Preface; Introduction; Chapter 1. Truss Layout Optimization; 1.1. Standard theory of mathematical programming; 1.2. Governing equations of truss structures; 1.3. Layout and topology optimization; 1.3.1. Basic problem statement; 1.3.2. Problem equivalence and numerical solution; 1.4. Generalization; 1.4.1. Self-weight and multiple loading; 1.4.2. Compliance optimization; 1.4.3. Volume optimization; 1.4.4. Stress singularity; 1.4.5. Local buckling singularity; 1.5. Truss geometry and topology optimization; 1.5.1. Optimization of nodal positions 1.5.2. Melting node effect 1.6. Concluding remarks; Chapter 2. Unified Formulation; 2.1. Literature review; 2.2. Disaggregation of equilibrium equations; 2.3. Minimum volume problem; 2.4. Minimum compliance problem; 2.5. Reduced formulation for single loading; 2.6. Nonlinear programming; 2.6.1. Barrier problem; 2.6.2. Sequential quadratic programming with trust regions; 2.6.3. Verification test; 2.7. Design

settings; 2.8. Concluding remarks; Chapter 3. Stability Considerations; 3.1. Literature review; 3.2. Lower bound plastic design formulation; 3.3. Nominal force method for local stability 3.4. Local buckling criterion 3.5. Formulation including stability constraints; 3.6. Numerical examples; 3.6.1. Three-hinged arch; 3.6.2. L-shaped frame; 3.7. Concluding remarks; Chapter 4. Structural Design Applications; 4.1. Reticulated dome; 4.2. Lateral bracing of Winter's type column; 4.3. Arch bridge; 4.4. Suspension bridge; 4.5. Dutch Maritime Museum; Conclusions and Future Prospects; Appendix; Bibliography; Index

Sommario/riassunto

The author of this book presents a general, robust, and easy-to-use method that can handle many design parameters efficiently. Following an introduction, Chapter 1 presents the general concepts of truss layout optimization, starting from topology optimization where structural component sizes and system connectivity are simultaneously optimized. To fully realize the potential of truss layout optimization for the design of lightweight structures, the consideration of geometrical variables is then introduced. Chapter 2 addresses truss geometry and topology optimization by combining m

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