Record Nr. UNINA9910821636803321 Autore Banichuk Nikolai Vladimirovich Titolo Optimal structural design: contact problems and high-speed penetration / / Nikolay V. Banichuk, Svetlana Yu. Ivanova Berlin, [Germany];; Boston, [Massachusetts]:,: De Gruyter,, 2017 Pubbl/distr/stampa ©2017 **ISBN** 3-11-053090-2 3-11-053118-6 Descrizione fisica 1 online resource (192 pages): illustrations SCI018000TEC009070SCI041000MAT003000 Classificazione Disciplina 624.1/771 Soggetti Structural analysis (Engineering) Joints (Engineering) Interfaces (Physical sciences) Lingua di pubblicazione Inglese **Formato** Materiale a stampa Monografia Livello bibliografico Nota di bibliografia Includes bibliographical references and index. Nota di contenuto Frontmatter -- Preface -- Contents -- Part I: Quasi-statics of contact interaction -- 1. Optimal contact pressure and optimal punch shape --2. Influence of forces applied outside contact region -- 3. Shape optimization of punch moving with friction -- 4. Optimization in contact problems under incomplete data -- 5. Application of probabilistic data -- 6. Minimization of material wear -- 7. Multiobjective optimization of contact pressure, wear of material, and energy dissipation -- Part II: High-speed penetration into deformable medium -- 8. Optimization of impactor shape -- 9. Strikers of nonaxisymmetric optimal shape -- 10. Multiobjective optimization of rigid shell -- 11. Optimization of truncated rotating strikers -- 12. Penetration into solid medium under strength constraints -- 13. Some problems of global multipurpose structural optimization -- 14. Analytical and numerical estimations of optimal parameters of layered

slab -- 15. Striker shape optimization using condition of minimal ballistic limit velocity for layered slabs -- Part III: Appendices -- Appendix A. Nonadditive functionals and extremum conditions -- Appendix B. Multivariant estimation of functionals and their sensitivity -- Appendix C. Basic ideas of multicriteria optimization -- Appendix D.

Evolutionary algorithm of global optimization -- Bibliography -- Index

Sommario/riassunto

This monograph studies optimization problems for rigid punches in elastic media and for high-speed penetration of rigid strikers into deformed elastoplastic, concrete, and composite media using variational calculations, tools from functional analysis, and stochastic and min-max (guaranteed) optimization approaches with incomplete data. The book presents analytical and numerical results developed by the authors during the last ten years.

This monograph studies optimization problems for rigid punches in elastic media and for high-speed penetration of rigid strikers into deformed elastoplastic, concrete, and composite media using variational calculations, tools from functional analysis, and stochastic and min-max (guaranteed) optimization approaches with incomplete data. The book presents analytical and numerical results developed by the authors during the last ten years. ContentsPart I: Quasi-statics of contact interactionOptimal contact pressure and optimal punch shapeInfluence of forces applied outside contact regionShape optimization of punch moving with frictionOptimization in contact problems under incomplete dataApplication of probabilistic dataMinimization of material wearMultiobjective optimization of contact pressure, wear of material, and energy dissipation Part II: Highspeed penetration into deformable mediumOptimization of impactor shapeStrikers of nonaxisymmetric optimal shapeMultiobjective optimization of rigid shellOptimization of truncated rotating strikersPenetration into solid medium under strength constraintsSome problems of global multipurpose structural optimizationAnalytical and numerical estimations of optimal parameters of layered slabStriker shape optimization using condition of minimal ballistic limit velocity for layered slabs Part III: AppendicesNonadditive functionals and extremum conditionsMultivariant estimation of functionals and their sensitivityBasic ideas of multicriteria optimizationEvolutionary algorithm of global optimization