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Sommario/riassunto

By discussing topics such as shape representations, relaxation theory and optimal transport, trends and synergies of mathematical tools required for optimization of geometry and topology of shapes are explored. Furthermore, applications in science and engineering, including economics, social sciences, biology, physics and image processing are covered. ContentsPart I Geometric issues in PDE problems related to the infinity Laplace operator Solution of free boundary problems in the presence of geometric uncertainties Distributed and boundary control problems for the semidiscrete Cahn-Hilliard/Navier-Stokes system with nonsmooth Ginzburg-Landau energies High-order topological expansions for Helmholtz problems in 2D On a new phase field model for the approximation of interfacial energies of multiphase systems Optimization of eigenvalues and eigenmodes by using the adjoint method Discrete varifolds and surface approximation Part II Weak Monge-Ampere solutions of the semi-discrete optimal transportation problem Optimal transportation theory with repulsive costs Wardrop equilibria: long-term variant, degenerate anisotropic PDEs and numerical approximations On the Lagrangian branched transport model and the equivalence with its Eulerian formulation On some nonlinear evolution systems which are perturbations of Wasserstein gradient flows Pressureless Euler equations with maximal density constraint: a time-splitting scheme Convergence of a fully discrete variational scheme for a thin-film equatio Interpretation of finite volume discretization schemes for the Fokker-Planck equation as gradient flows for the discrete Wasserstein distance