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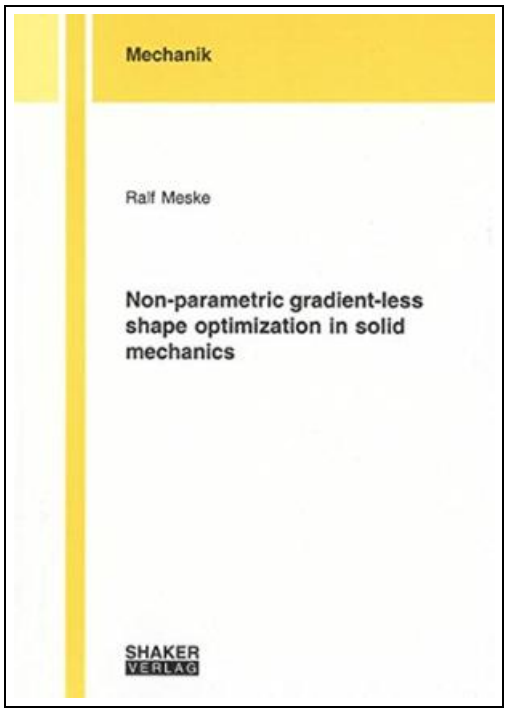

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Shaker Verlag Jul 2007, 2007. Taschenbuch. Condition: Neu. Neuware - A non-parametric gradient-less shape optimization approach is presented. The shape optimization algorithm is based on optimality criteria, which leads to a robust and fast convergence independent of the number of design variables. Sensitivity information of objective function and constraints are not required, which results in a superior performance and offers the possibility to solve the structural analysis task using fast and reliable industry standard finite element solvers like ABAQUS, ANSYS, I-DEAS, MARC, NASTRAN or PERMAS. The approach has been successfully extended on non-linear problems including material, boundary and geometric non-linear behavior. The non-parametric geometry representation creates a complete design space for the optimization problem, which includes all possible solutions for the finite element discretization. The approach is available within the optimization system TOSCA and is used successfully for realworld optimization problems in industry for several years. The approach is compared to other approaches and the benefits and restrictions are highlighted. The optimality criteria approach was originally developed for stress minimization problems. It is extended on problems of volume minimization with a single or multiple stiffness constraints using a controller strategy. For the extension of the approach to frequency problems an optimality criterion with respect to the maximization of the first natural frequency with a volume constraint is derived for continuum solids. An efficient redesign rule for frequency problems is developed to achieve the required shape modifications. The optimality criterion is extended to volume minimization problems with multiple frequency constraints. Several academic and real-world examples are presented. 141 pp. Englisch.

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