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A Technique for Nonsmooth Optimization Based on the Interior Point Feasible Directions Algorithm

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Nonsmooth functions are frequently present in Structural Optimization. This is the case with applications involving eigenvalues. Smooth optimization techniques generally fail in nonsmooth problems. A new method for minimization of convex functions, not necessarily differentiable, is presented. This approach defines a constrained optimization Equivalent Problem (EP) and a sequence of Auxiliary Problems (AP), where the constraints of EP are approximated by cutting planes. At each iteration a Search Direction for EP is obtained by computing a Feasible Descent Direction of AP. If the step length is short, AP is updated and a new search direction is computed. This procedure is repeated until a good step is obtained. The Feasible Directions Interior Point Algorithm for constrained smooth optimization, [1], is employed to compute the search direction. We prove global convergence and solve very efficiently several test problems. [1] Herskovits J. Feasible Directions Interior Point Technique For Nonlinear Optimization, JOTA, v99-1, 1998.

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