THE ITERATIVE AGGREGATION IN HIERARCHICAL OPTIMIZATION UNDER RANDOM COEFFICIENTS AND UNCERTAINTY

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The decomposition algoritm based on iterative aggregation is applied for wide class of non linear hierarchical mathematical programming problems as well as optimal control ones where the subsystems are described by ordinary and partial differential equations. The upper level solves the intermediate aggregation problem. The lower level considers the independent problems of subsystems. The simple resolving of the aggregation problems characterizes the effective uses of this approach. We concretize the applications for stochastic cases. The two-stage problem is offered for discrete probabilities of the coefficients in the main economical model. In this case the aggregation problen is reduced to the optimization of the concave piecewise linear function only with one variable. If the coefficients of the main model are satisfied with continuous distribution functions then the one-stage problem is considered. The aggregation problems are solved either analyticaly or reduced to the non linear equation only with one unknown variable. The hierarchical dynamic system under uncertainty is investigated where the initial state data are not given exactly. They belong to a convex set. The maximal deviation of the trajectory terminal points is minimized. The Pontrjagin's maximum principle is applied effectively in all steps of the iterative process, The hierarchical optimal control problem of the mathematical physics is analysed when the rods moves through furnaces and get warm. The analitical formula of the aggregation problem is obtained in this case. The hierarchical optimal control problem of the gas motion through tubes is investigated in detail.