| Title | **Application of the Benders decomposition to a stochastic mixed integer UC problem** |
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| Abstract | The Benders' method usually divides the collection of decision variables of a mathematical problem into two sets - a first set that comprises the collection of variables that represents a first-stage decision and a second set that comprises the collection of variables that represents a recourse action or second-stage decision. Usually, the first set contains the collection of integer variables, and the second set is formed by the continuous variables with the purpose of having a convex recourse function. Convexity is then exploited in the construction of algorithms to obtain an optimal decision.<br>Here we present an extension of the Benders' method to deal with multistage problems with integer variables in any stage. This extension is based on the use of the Lagrangean Relaxation technique as the method to solve the individual subproblems of each stage. Multistage problems with mixed integer decisions in each stage appear e.g. when splitting a Unit Commitment problem with stochastic load data and a planning horizon of several days into individual stages representing the single-day operation. Here we present an application of the proposed method to a stochastic weekly Unit Commitment model. |
| Key words | Unit commitment, Benders Decomposition, Mixed Integer Problem, Lagrangean Relaxation, Stochastic Optimization |