DEPARTAMENTO DE
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CONFERENCIA

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On risk averse multistage mixed 0-1 optimization modelling under a mixture of Exogenous and Endogenous Uncertainty

We present a general multistage stochastic mixed 0-1 problem where the uncertainty appears everywhere in the objective function, constraints matrix and right-hand-side. It is represented by a scenario tree that can be a symmetric or a nonsymmetric one. We consider two types of uncertainty, on one hand the traditional so named exogenous uncertainty where the only action to be made by the modeler is to react in order to protecting his/her decisions and, on the other hand, the non-usually treated uncertainty so named endogenous one, where the modeler decisions can change the weights and / or the outlooks of potential scenarios to occur. The optimization of the objective function expected value subject to Stochastic Dominance (SD) constraints for a set of profiles on a multifunction setting is presented for risk management where both types of uncertainty are treated. As a result a mixed 0-1 quadratic constrained quadratic Deterministic Equivalent Model (DEM) is presented. Given the large-sized dimensions of the problem, it is unrealistic to solve the problem up to optimality by plain use of MIP solvers. Instead of it, decomposition algorithms of some type should be used. We consider our Stochastic Dynamic Programming algorithm -the so named SDP risk averse SD-, to handle the equivalent strong mixed 0-1 linear model on which the bilinear DEM has been converted. A pilot case for optimizing resource allocation in a three-stage planning for a disaster' mitigation is used as a pilot case.

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