Clustering algorithms for scenario tree generation: Application to natural hydro inflows

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Abstract-

In stochastic optimization problems, uncertainty is normally represented by means of a scenario tree. Finding an accurate representation of this uncertainty when dealing with a set of historical series is an important issue, because of its influence in the results of the above mentioned problems. This article uses a procedure to create the scenario tree divided into two phases: the first one produces a tree that represents accurately the original probability distribution, and in the second phase that tree is reduced to make it tractable. Several clustering methods are analysed and proposed in the paper to obtain the scenario tree. Specifically, these are applied to an academic case and to natural hydro inflows series, and comparisons amongst them are established according to these results.

Index Terms- Scenario tree generation; Uncertainty modelling; Stochastic programming

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