

Optimal operation of a hydropower plant in a stochastic environment

E. Schwartz; I. Segarra Tamarit; I.C. Figuerola-Ferretti Garrigues

Abstract-

Given the currently changing climate conditions it is of primary importance to optimise the management of hydropower resources. This paper proposes a framework in a dynamic setting to determine the water outflow that maximises the value of a water resource for a given reservoir. The model includes two sources of uncertainty, the water inventory determined mainly by the water inflow and the electricity prices. It is implemented under the stochastic optimal control approach and calibrated using monthly data of reservoir characteristics from ResOpsUs. The results indicate that the inventory dynamics are specially important in valuing reservoir resources. The application of optimal management policies guarantees the long-term sustainability of the reservoir. The possible effects of climate change are considered in a sensitivity analysis to changes in the price and water inventory dynamics.

Index Terms- Water management; Climate change; Hydro power; Sustainable reservoir

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