

This thesis deals with the stochastic optimization problem of hydro reservoir management. External inflows and market electricity price are both considered as random inputs to the model, which is designed as joint chance constrained programming. The main goal of the optimization problem is to maximize the profit from hydro energy usage together with minimizing the cost of used water. The random component is modelled by suitable stochastic processes based on historical data and then approximated via scenarios. Seasonal deterministic model is another model that is presented in this thesis. This model helps appraise water stored in every each reservoir's compartment. The estimates of water values are based on dual variables. Finally, in the practical part the hydro reservoir management problem is applied to the real hydro valley located on the Vltava river. This part also deals with an option of increasing the number of pumping stations in this particular hydro valley.