The Joint Economic Dispatch Based on Lower Semi-Absolute Deviation Risk

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Abstract: The uncertainty of wind power generation leads to the uncertainty of operation cost in economic dispatch, and brings risks to scheduling, namely operation risk. In order to take the uncertainty of wind power (WP) into account and achieve a better management of operation cost risk, a set of scenarios and corresponding probabilities are adopted to approximate wind power output. Taking advantages of mean lower semi-absolute deviation (MLASD) model, the proposed economic dispatch (ED) model deals with the trade-off between the expectation and risk of operation cost. As pumped storage (PS) power station is good at balancing WP uncertainty, it is included in the proposed ED model. Numerical results show that the proposed model can well reflect the essential characteristics of economic dispatch with WP and PS, can reflect operators' downside aversion for operation cost risk, can be transformed into simple format and be solved fast, and is good at the management of operation cost risk.

Key words: power system; economic dispatch; wind power; lower semi-deviation risk