Comparison between the proposed method and existing methods based on affine policy

-- Controlled Evolution-Based Day-Ahead Robust Dispatch Considering Frequency Security with Frequency Regulation Loads and Curtailable Loads

We have constructed a day-ahead robust dispatch model based on the affine strategy shown in [1], and the affine dispatch policy is constructed with reference to the equation (2) in [1]. Then, we use the affine policy-based day-ahead robust dispatch model to solve the UC $\hat{x}_{g,t}$ and the curtailable load capacity $\hat{p}_{c,t}^{\mathrm{cap}}$, which are shown in Fig. 1 and Fig. 2, respectively. These day-ahead decisions can guarantee the feasibility of intraday operation.

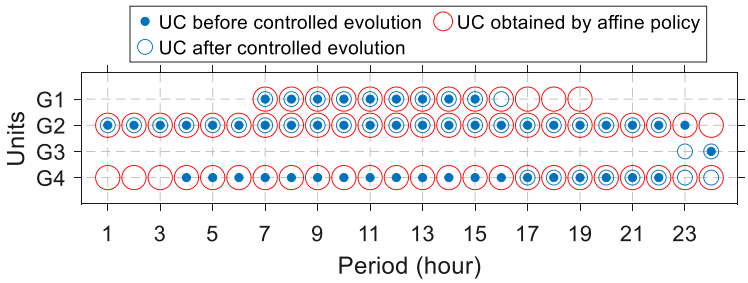

Fig. 1 Comparison of UC results

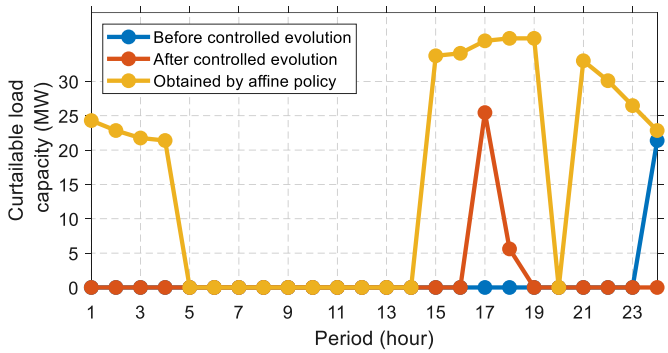

Fig. 2 Comparison of Curtailable load capacity

However, as shown in Fig. 1, for coping with the same degree of uncertainties, the UC decisions obtained by affine policy needs to add more synchronous generators compared with the UC results of the proposed method.

Similarly, as shown in Fig. 2, to ensure the reliable power supply of the power system, the decisions obtained by affine policy needs to deploy more curtailable load capacity in advance compared with the method proposed in this paper.

Therefore, compared with the mainstream affine policy-based method, the proposed controlled evolution framework enables the same reliable power supply with less resource deployment. This is also a reflection of the advantages of the method proposed in this paper.

References

[1] Lorca A, Sun X A. Multistage robust unit commitment with dynamic uncertainty sets and energy storage[J]. IEEE Transactions on Power Systems, 2016, 32(3): 1678-1688.