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OPTIMIZING OVER PROBABILITY MEASURES TO MANAGE  
FLEXIBILITIES IN POWER SYSTEMS

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With the massive integration of renewable energies (photovoltaic (PV) and wind power) into the power grid, new uncertainties are impacting system balance. At the same time, advances in smart technologies and batteries offer the possibility of controlling the consumption of a large number of electrical appliances (electric vehicle recharging, heat pumps, etc.) which can contribute to system balance and thus compensate for the uncertainties induced by the integration of new renewable energies. In this framework, a major technical challenge is therefore to optimize the management of this large number of heterogeneous assets distributed across the network. This constitutes a large scale and nonconvex optimization problem which leads us to consider probabilistic relaxations where the decision variables are probability measures.

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