**Highlights for the manuscript, “Look-Ahead SCOPF (LASCOPF) for Tracking Demand Variation via Auxiliary Proximal Message Passing (APMP) Algorithm”**

Sambuddha Chakrabarti & Ross Baldick

* The main objective of this paper is to present the *(N-1) Security Constrained Optimal Power Flow (SCOPF)* for multiple dispatch time intervals-problem and a solution scheme, based on the *Model Predictive Control (MPC)* paradigm to solve it. At the onset of every time we solve it, we do so for the upcoming and several subsequent dispatch intervals, for which we have the load forecast, such that the power generators track the demand variation at the minimum possible cot, while abiding by the different network constraints, as well as generation limits.
* While solving the above-mentioned problem, we also consider the possibility of vulnerable lines, that may go out of service, during the actual operation. We dispatch the generators in such a way, that even if one of these outages, or “*contingencies*,” as we will henceforth call them, happens (one at a time), the post-contingency power flows will be well below the maximum limits allowed on each of the transmission lines.
* In order to solve such a huge size of the problem (even for small networks) within a reasonable time, we have proposed the *Auxiliary Proximal Message Passing (APMP)* algorithm. It is a bi-layered distributed decomposition-coordination type algorithm, which consists of an outer coarse-grained *Auxiliary Problem Principle (APP)* layer, which splits the computation across different dispatch intervals, and an inner fine-grained *Alternating Direction Method of Multipliers-Proximal Message Pasing (ADMM-PMP)* layer, which splits the computation across the different generators, transmission lines, loads, and nodes.
* We have provided a detailed mathematical analysis and/or cited appropriate published references for the derivation of important theoretical results.
* We have validated our models and algorithms and demonstrated their capabilities with some numerical simulations, performed on the IEEE test cases.