PSERC Power Systems Engineering Research Center

PSERC WEBINAR

Mixed Integer Programming Techniques for Efficient Black Start of the Power System

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Equipment failures, operator errors, natural disasters and cyber-attacks can and have caused extended blackouts of the electric grid. Even though such events are rare, preparedness for them is critical because large scale power outages endanger human lives, compromise national security, and result in economic losses of billions of dollars. The restoration of a power system after an extended blackout starts around units with enhanced technical capabilities, referred to as black start units (BSUs). Allocating and maintaining these units is costly and can severely impact the restoration security and time. We examine the planning problem of optimally allocating BSUs on the grid subject to a budget constraint, while also incorporating constraints of the restoration of the power system. We explore techniques to increase the computational efficiency of the problem, such as customized heuristics and stronger formulations for part of the constraints. We present experiments on multiple synthetic power system instances.

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LINK TO WEBINAR

(11:00-12:00 P.M. PDT)

Georgios Patsakis received his B.S. degree in electrical and computer engineering from the National Technical University of Athens (NTUA), Greece, in 2014. He received his Ph.D. in industrial engineering and operations research (IEOR) from the University of California, Berkeley, USA, in 2020. His research interests include optimization for power systems applications with a focus on Mixed Integer Programming. He has also worked on control for power electronics and electric drives, as well as on wind turbine and HVDC modeling and control. He is currently an Applied Scientist for the Middle-Mile Planning Research and Optimization Science team at Amazon.