

Data-driven situation awareness for electrical power systems

The title of the presentation is “Data-driven Situation Awareness for Electrical Power Systems”. This work is supported by the National Key Research and Development Program of China. With the increasing power generation in China and the large-scale networks in our country, the model complexity and computational efficiency of situation awareness are facing enormous challenges. Furthermore, the integration of renewable energies and the increasing of flexible loads result in the operating states more severe fluctuation than ever before. Hence, it is difficult to track the operating states accurately and timely. To conclude, a completely new state estimation model that can fulfill the estimation accuracy, computation efficiency and robustness requirements in modern power systems, is urgently needed.

The first research is the Intelligent identification of suspicious lines, allowing the physical model of power systems accurately. Based on this, fast real-time state estimation is proposed in a data-driven manner. Finally, transfer learning is employed in the fast real-time state estimation for changing topologies. Simulation results show that the transfer learning-based data-driven state estimation keeps high computation efficiency and has higher estimation accuracy than other conventional estimation methods.