



## **WG on Power System Static and Dynamic State Estimation**

### **IEEE PES Bulk Power System Operation Subcommittee**

**Officers: Lamine Mili and Junbo Zhao**

### **Coordination with Power System Dynamic Performance Committee**

**Liaison: Zhenyu Huang**

### **Coordination with Power System Relaying Committee**

**Liaison: Sakis Meliopoulos**

## **1. History of the WG**

The WG on State Estimation Algorithms was created in the early 1990's. Its main aims are to discuss the latest progress of state estimation algorithms, gather industrial perspectives and propose solutions for practical problems, educate the next generation of power engineers for control center applications and students in learning and using new tools.

## **2. Reasons of Revising WG Name and Redefining Scopes**

The objectives of WG on State Estimation Algorithms have been met with the organization of many panels and several tutorials. Furthermore, the WG initiated 2 Task Forces: one TF chaired by Dr. Ali Abur dealt with state estimation concepts and terminology, the work of which resulted in the publication of an IEEE technical report, and recently, a second TF chaired by Dr. Junbo Zhao has been focusing on dynamic state estimation, whose work resulted in the publication of IEEE Transactions papers. This TF will be concluded next year with an IEEE technical report as the final delivery. The static state estimation has been quite mature and has been widely used by utilities.

With the increasing penetration of DERs, responsive loads, and microgrids, the power system has been subject to different types of dynamics. The majority of today's monitoring and control tools at the control center EMS are based on steady-state power system models, which cannot capture the system dynamics. With the large deployment of advanced sensor and communication technologies, such as wide-area measurement systems on the power transmission systems worldwide, the development of dynamic state estimation for power system, modeling, monitoring, operation, control and protection becomes possible and essential.



### **3. New Scopes**

Its main aims are to 1) discuss the latest progresses of static state estimation (hybrid state estimation, linear state estimation and forecasting-aided state estimation), and dynamic state and parameter estimation algorithms, as well as their applications; 2) gather industrial perspectives and provide solutions and recommendations to vendors, national labs, utilities and ISOs in using of dynamic state and parameter estimation for enhancement of the security and resiliency of electric power systems, 3) educate the next generation of power engineers for dynamic state estimation enabled power system modeling, monitoring, operation, control and protection applications and students in learning and using new tools.

### **4. Transition Plans**

Since the majority of the original WG members on State Estimation Algorithms is also the member of TF on Dynamic State and Parameter Estimation, the transition will be smooth. We will send out notification to the WG members and inform all of them. We will also invite them to continue the discussions and contributions. The new WG also involves with PSDPC and PSRC but we have two liaisons, Henry Huang and Sakis Meliopoulos, who will help the coordination and gather inputs from them to yield broader impacts on our new WG across the power community.

### **5. Deliverables for the next 2 years**

- Organize two panel sessions during the PES GM 2022 and 2023;
- Deliver two IEEE Transaction papers from the TF on Dynamic State and Parameter Estimation (under preparation and will be submitted to TPWRS);
- Conclude the TF on dynamic state and parameter estimation with the publication of an IEEE Technical Report by the end of year 2021;
- Kick off the new TF on standard test systems for power system state estimation and monitor its progress;
- Engage more industry persons in offering suggestions and recommendations to the transition and practical applications of power system dynamic state estimation;
- Organize regular webinars and WebEx meetings among the WG members.