

Transient stability in renewable-energy-dominating power systems

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Abstract– With the fast development and increasing integration of renewable energy including wind and solar powers, building a renewable-energy-dominating power system has become one of key national strategies in China. Very recently on July 28, 2021, China association for science and technology has proposed ten key frontier scientific problems, including one problem: "What is the path optimization and stability mechanism of the renewable-energy-dominating power systems?" Clearly the renewable-energy-dominating power system stability faces some big, basic challenges, such as complex system, nonlinearity, multi-time scale, complicated dynamical interaction, hybrid dynamics, intermittent behavior, low inertia, unclear instability characteristics, etc. Some are common for any general complex nonlinear systems. In this talk, I will deep into the transient stability problems in renewable-energy-dominating power systems. I will also introduce some of our recent works. I hope that these basic problems could arouse general interest of researchers in the fields of not only electrical engineering, but also system engineering, nonlinear dynamics, and complex nonlinear systems.