Paris Session 2022

Enhancing off-line wide-area EMT simulation

SC4

PS 3 / Q 11 What are the latest initiatives for reducing the computational time of offline wide-area EMT simulation for power systems with high share of inverter-based resources, and how are these off-line models compared in general against wide-area real-time EMT models?

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Speed Improvements in Wide-Area EMT Models

- Network splitting across multiple projects
- Initialisation of IBR models and synchronous generators
- Remove unnecessary relay and protection blocks
- Load models
- Shared memory vs TCP/IP connection for multi-rate data transfer results in almost 6 – 10 times faster !
- Hardware (and software OS) upgrades
- Future considerations
  - Average switching models for IBR
  - Other EMT software improvements when projects run in parallel

Offline EMT analysis improvement

- PSCAD V4 – 2020
  - More than 180 models running in parallel
  - Timesteps between 2 – 50 µs
  - 3 dedicated servers
  - 14 cores each
  - 4 hours to simulate 30 seconds
- PSCAD V5 - 2022
  - 1 dedicated server with 64 cores
  - 1h 45m to simulate 30 seconds