Paris Session 2022

Digital Twins integrated in ADMS tools for agile simulation in distribution systems

C6 - ACTIVE DISTRIBUTION SYSTEMS AND DISTRIBUTED ENERGY RESOURCES

PREFERENTIAL SUBJECT 2 – Innovative Planning and Operation of Active Distribution Systems

Question 2.8 Are there any case studies that can be used to evaluate and compare the simulation results with the actual phenomena on a real power grid?

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The key of a good simulation environment is a « Real Real Time » digital twin

•*The concept of the digital twin is relatively abstract and it can be understood in radically different ways depending on the scope of application.*

• Modern simulation tools for distribution networks should be embedded in the ADMS systems. A set of different simulation tools can be considered a digital twin if:

They are a digital replica of the physical system and they consider both the physical system, the digital one and the bidirectional transfer of data between digital and physical system.

- *The digital twin is the core of the data-driven decision process and a key stone in the digitalization process of a distribution company.*
- *A set of off-line decoupled simulation tools is no longer acceptable in the new planning and operation paradigm.*
- *Low voltage should be definitely integrated in the simulation process*

Digital twin's must-have features according to our real experiences

1. Collecting data from physical system.
2. Perform data transfer between physical and digital
3. Perform data preprocessing
4. Store data in an easily accessible way
5. Implement automatically the different mathematical models
6. Solve math. models with adequate speed.
7. Generate automatic or semi-automatic decisions
8. Bidirectional communication with the physical system to execute actions
9. Cybersecurity is a must in the whole process