Cyber-physical co-simulation framework to emulate various types of attacks on distribution systems and identify the weak points of the system.
Development of a **cyber-physical security simulation testbed** for carrying out cyberattacks and analyzing its impact on distribution systems.

- Physical layer -- **RTDS** and Cyber layer -- **NS-3** network simulator.
- Testbed is designed to use the **Modbus** protocol for all communication, a commonly used protocol in industrial automation applications.

**IEEE 13-bus Feeder System with 4 Distributed Energy Resources**

- **Man-in-the-Middle Cyberattack**
  - On the communication channels between the aggregator and the DERs.
  - Zero flexibility by DERs
  - Imbalance in generation and load
  - **Frequency ↓↓**

- **Experimental Setup**

- **Graph** showing frequency changes over time.