The new “dynamic” reality challenges

Grid operators face a new dynamic reality [1] due to:

- More renewable energy sources
- More flexible devices

→ High uncertainty in real-time operation
→ **ONLINE DYNAMIC SECURITY ASSESSMENT** for continuous grid monitoring and assessment

**Challenge I : Inaccurate online predictions**

Reasons for inaccurate online classification decisions [2]:

- Online operating conditions are different from those included in the knowledge base
- Forced outage of lines and transformers

→ New stage near real-time operation for **UPDATING** the classifier

**Markov Blanket based Feature Selection**

Need of fast algorithms with high predictive accuracy performances:

→ **MARKOV BLANKET** based Feature Selection algorithms

Advantage: Taking into account the knowledge of the network topology

Markov Blanket of Y is given by its parents, children and spouses

Our approach (MB TAN)

**The concept of “preparing offline”**

The growing scale of power systems increases:

- Number of active contingencies
- Number of measurable parameters

→ The classifier update is computationally **EXPENSIVE** for near real-time operation

→ **FEATURE SELECTION** for dimension reduction of attributes [3]

Existing Feature Selection techniques:

- Filter: low accuracy at low computation cost
- Wrapper: high accuracy at high computation cost

**Case study: IEEE 68 bus system**

Tests over 22 contingencies considering dynamic stability

Advantages of the MB TAN approach:

- The best trade-off between accuracy performances and computational costs
- Time scheduling of the classifier update is easier because the computational time is almost constant over all contingencies

**REFERENCES**