SweGRIDS

Improved observability in the power system: Real-time stability monitoring and control

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SweGRIDS

RESEARCH AIM & OBJECTIVES

- Generator Rotor Angles
- Stator Voltages
- Stator Currents
- Field Currents

Real Time Measurement
- New developed algorithm.
- Lyapunov exponent algorithm.

Utilize Algorithm
- Real time monitoring
- Instability monitoring of rotor angle

Rotor Angle Monitoring

MLE MODEL BASED AND MODEL FREE TECHNIQUE

DETECTION OF ROTOR ANGLE INSTABILITY

Identify Critical Generator

Maximal Lyapunov Exponent Calculation

Model Based Approach

Model Free Approach

Transient Rotor Angle Stability Criteria

to tf tc
DETECTION OF ROTOR ANGLE INSTABILITY

Voltage Deviation Technique

- ROCOV (pu/$s$)
- Stable region
- Marginally stable trajectory
- Stability boundary
- Unstable region

Voltage deviation, $\Delta V$ (pu)

Graphs showing the stability of the system with and without instability.
RESEARCH OUTCOME

Results Achieved

Result # 1 Identify Critical Generators

Result # 2 Developed Algorithms to find instability

Result # 3 Detection of instability based on algorithms

Result # 4 Implementation of these algorithms on IEEE 39 Bus System

Result # 5 Comparative Analysis based on different techniques

Implemented Techniques

- Single Machine Infinite Bus System
- Three generator System
- IEEE 39 Bus System