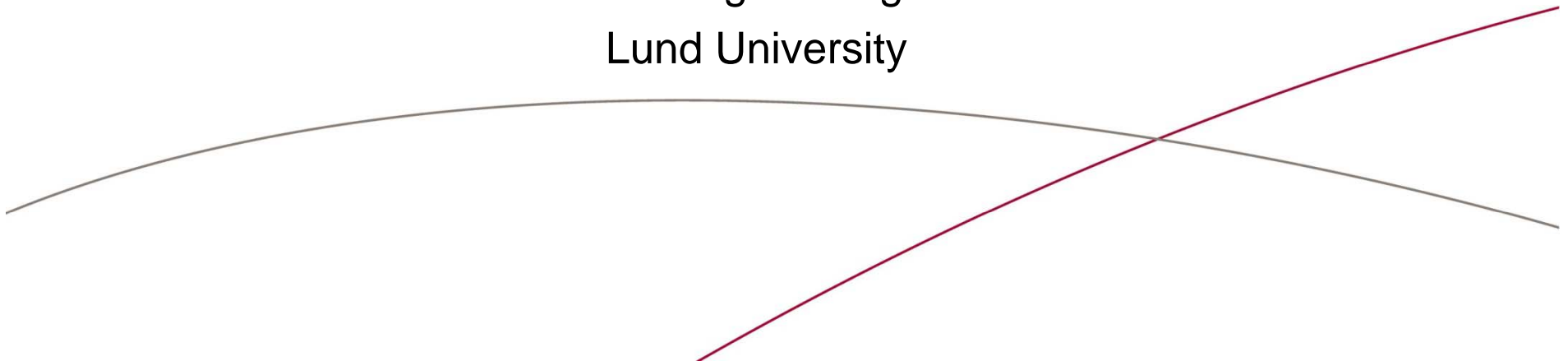


Welcome to

Risk and Vulnerability in Infrastructures

Industrial Electrical Engineering and Automation
Lund University



Part I – Until coffee

Welcome

Ass. Prof. Olof Samuelsson, Lund University

Interdependence - a central subject in crisis management research at Lund University

Prof. Kurt Petersen, Lund University

A framework for studying the influence of the information infrastructure on power system security

Prof. Daniel Kirschen, Manchester University

Transport infrastructure vulnerability research at KTH

Prof. Lars-Göran Mattsson, Royal Institute of Technology (KTH)



Part II – After coffee

A framework for analysing extraordinary events in the power system

Prof. Gerd Kjølle, SINTEF

On Risk assessment in energy infrastructures with focus on the electric power system

Prof. Lina Bertling, Chalmers

Dependability of IT systems

Dr. Martin Höst, Lund University

Gothia Power scholarship for students 2010

17.00 End of seminar



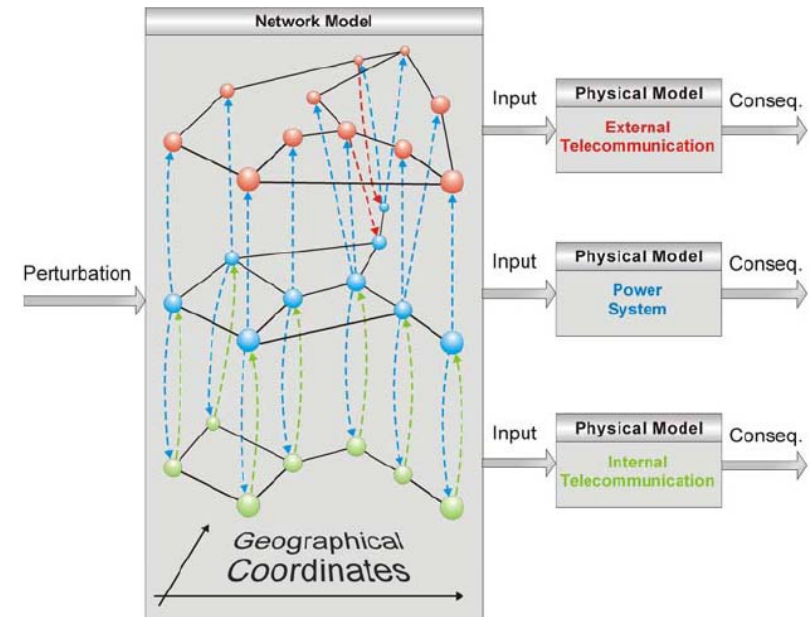
Infrastructure research at IEA

- Power systems
 - Minimizing interruption time
 - Vulnerability analysis
 - Extensive cable networks
 - Restoration
 - Island operation
 - Network integration of new generation
 - Windpower
 - Microgeneration
- Water systems
 - Optimal control of wastewater treatment



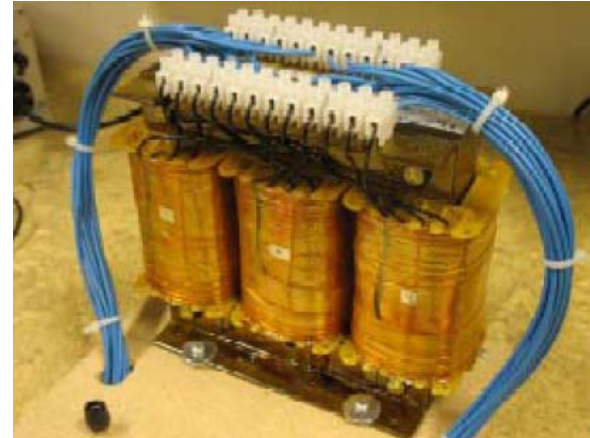
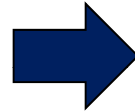
Vulnerability analysis

1. Vulnerability analysis of technical infrastructures
2. Interdependent infrastructures
3. Complex socio-technical systems



- Lund University Centre for Risk Analysis and Management
- PhD candidate Jonas Johansson
- Funding: Swedish civil contingencies agency

Extensive cable networks

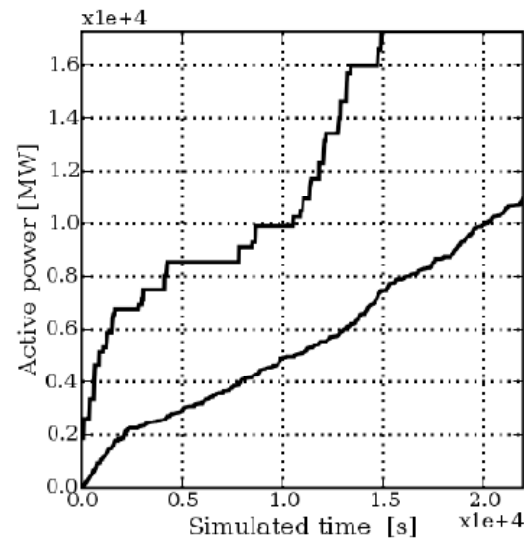
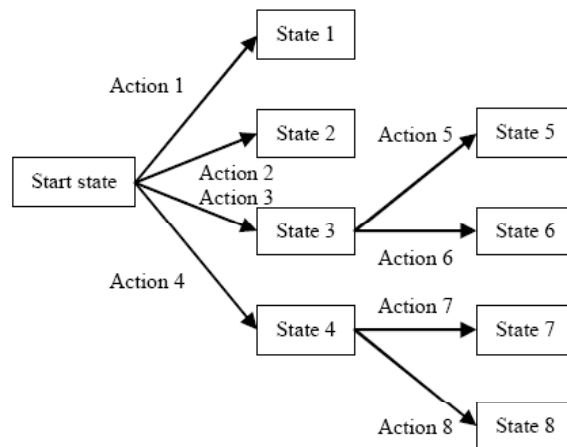


- Lab-scale distribution network
 - Resonant earthing
 - Distributed compensation
 - Automatic tuning of Petersen-coil
- Teaching and research
- Docent Magnus Akke
- Funding: E.ON Elnät



Restoration

- Automation based on simulations
- Tree-search algorithm
- NORDIC32 test system



- PhD candidate Lars Lindgren, finished 2009 with licentiate
- Funding: Energinet.dk, Malmö högskola

Island operation

- Islanding with asynchronous generation →
 - Mechanical model of SEIG
 - Blackstart with SEIG
 - PV-curve for Semi-Kaplan
 - Fault currents of SEIG
 - Rides through earth fault
 - Unselective fault clearing
- PhD candidates licentiates 2009
Johan Björnstedt, Francesco Sulla
- Funding: Svenska Kraftnät



Network integration of windpower

- Windpower integration into existing networks
 - Reactive power control
 - Curtailment
 - Tap changers
 - Electricity meters
- PhD candidate Ingmar Leisse
- Funding: E.ON Sweden
- Network integration of non-synchronous generation
 - Frequency dynamics
 - Frequency control
 - Fault currents
 - Grid fault ride-through
- PhD candidates Johan Björnstedt and Francesco Sulla
- Funding: Elforsk AB



Network integration of micro-generation

- EU project ADINE (Active Distribution Network) 2007-10
- IEA: Voltage control at 400 V with Compower microturbine

