

# Course in Power System Voltage Stability

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**Starting time:** June 3, 2024

**Ending time:** June 5, 2024

**Location:** Chalmers, Gothenburg, possibility to also participate via Teams/Zoom

**Suitable for:** Power system engineers working in the power industry, PhD-students and lecturers in Nordic Universities

**Language:** English

**Lecturers:** Evert Agneholm, Daniel Karlsson, Lena Max and Massimo Bongiorno

**Course fee:** 11 900 SEK (exkl. moms). Teachers and Ph. D. students at universities pay a reduced fee of 1000 SEK (excl. VAT)

**Registration and questions:** [evert.agneholm@hv.se](mailto:evert.agneholm@hv.se), +46 732 498920

**Last day for registration:** May 6, 2024

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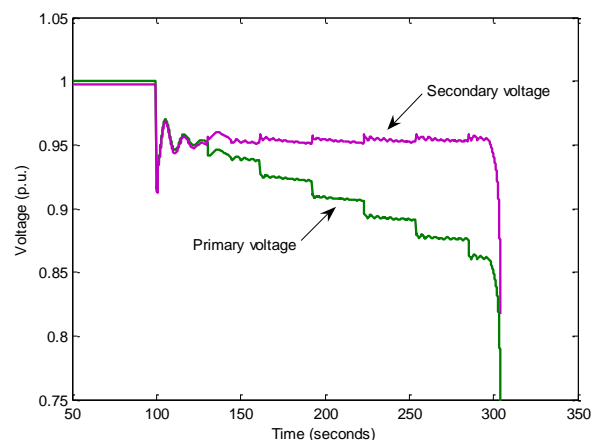
The ongoing energy transition implies significant challenges for our power systems. To really understand the changes going on, possibilities and limitations for different future technology directions, and the abilities also in the future to provide a stable and robust power system, it is essential to understand the different forms of power system stability.

University West and Chalmers University of Technology will therefore give a series of courses about power system stability. Starting June 3-5, 2024, at Chalmers in Gothenburg with the course in Voltage Stability. The sessions will be conducted by specialized university teachers and experts from the industry. For the first three days in June 2024, the focus will be on lectures, but also laboratory demonstrations and PSS/E calculations and simulations will be included. We also plan to visit a local production plant. For a deeper understanding, homework assignments, involving PSS/E calculations and simulations, will be offered. For these assignments there will be support possibilities via Teams or Zoom, and in the autumn, there will be a closing seminar, where the assignments and solutions are presented and discussed. For PhD students the course will give course credits that will depend on how many assignments that has been performed.

Since June is the perfect time for a visit to Gothenburg, there will be activities also in the evenings. Take this unique opportunity to learn more about power system stability, meet new and old colleagues and enjoy Gothenburg!  
See you in June at Chalmers

***See you in June at Chalmers!***

Evert, Daniel, Lena & Massimo



## Course content

S1: Welcome and Introduction – Massimo Bongiorno, Evert Agneholm, Daniel Karlsson and Lena Max. Introduction to the subject; in general, and with focus on voltage stability; introduction of the participants and lecturers.

General Aspects of Electric Power Systems (CWT 1)

S2: What is Voltage Stability (CWT 2)

S3: Transmission System Reactive Power Compensation (CWT 3)

S4: Power System Loads (CWT 4)

S5: Synchronous Generation Characteristics (CWT 5)

S6: Renewable Generation Characteristics

S7: Battery Energy Storage Characteristics and use

S8: Grid Code Requirements Impact on Voltage Stability

S9: Simulation of Equivalent Systems (CWT 6)

S10: Voltage Stability of a Large System (CWT 7)

S11: Voltage Stability with HVDC Links and FACTS devices (CWT 8)

S12: Power System Planning and Operating Guidelines (CWT 9)

S13: Power System Planning and Operation – Example from Sweden

S14: Voltage Stability Incidents in Sweden 1983 and 2003

S15: Voltage Stability Incidents in other Systems

S16: Wide Area Protection Schemes to Counteract Voltage Instability

S17: Phasor Measurements & Analysis

S18: Studying voltage stability using PSS/E

S19: Demonstration of Voltage Stability in lab environment using a synchronous machine and a physical modelling of a transmission line

S20: Delivery and review of the assignments (mainly for Ph. D. students)

(S21: Invited speakers)

(S22: Study visit at a production plant)

S23: Summary, Conclusions, Course Evaluation, Discussion

*(CWT X) refers to chapter X in the course book.*

**Literature:** Book “Power System Voltage Stability” by Carson W. Taylor, reports, papers and ppt presentations.

**Teachers:** Prof. Daniel Karlsson, prof. Evert Agneholm, Dr. Lena Max and prof. Massimo Bongiorno.

