

Postdoctoral Research Work

- **Variable-Speed Operation of Hydropower Plants**
- **Vibration of Hydro Generators**



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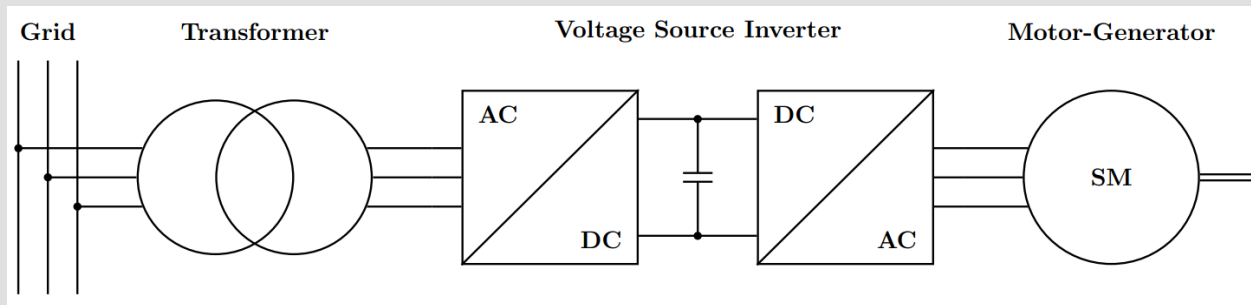
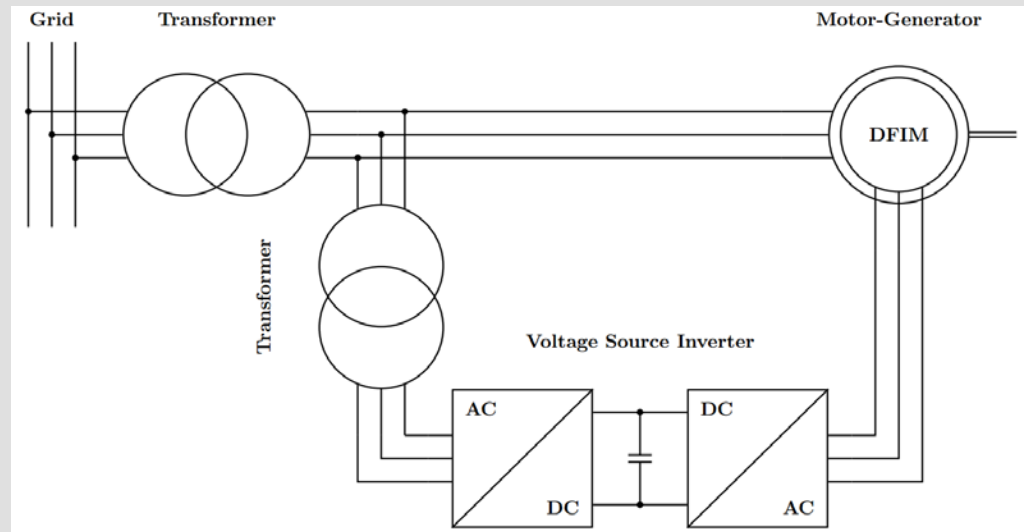


Variable Speed Operation

- Rotational speed can be adjusted.
- Significant advantages
 - Power system: improving flexibility and integration of renewables
 - Power plant: improving hydraulic efficiency and extending the operating range
- Pumped-storage plants (pump-turbine)

Variable Speed Operation

- Configurations:

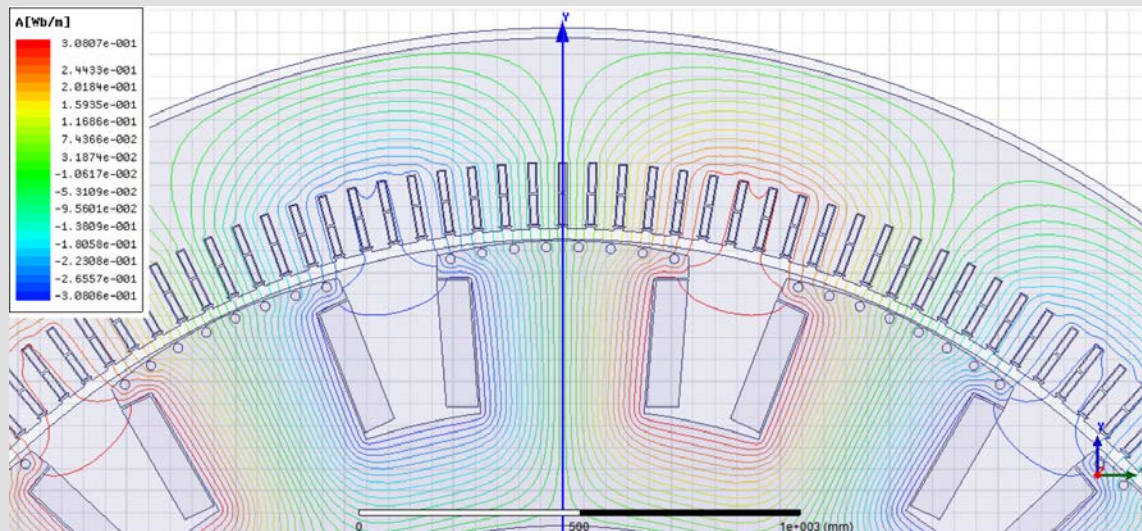


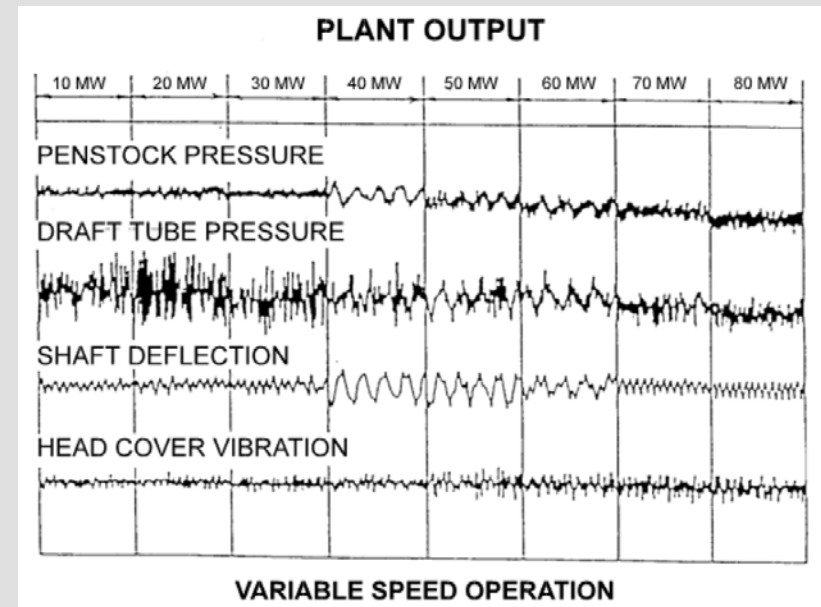
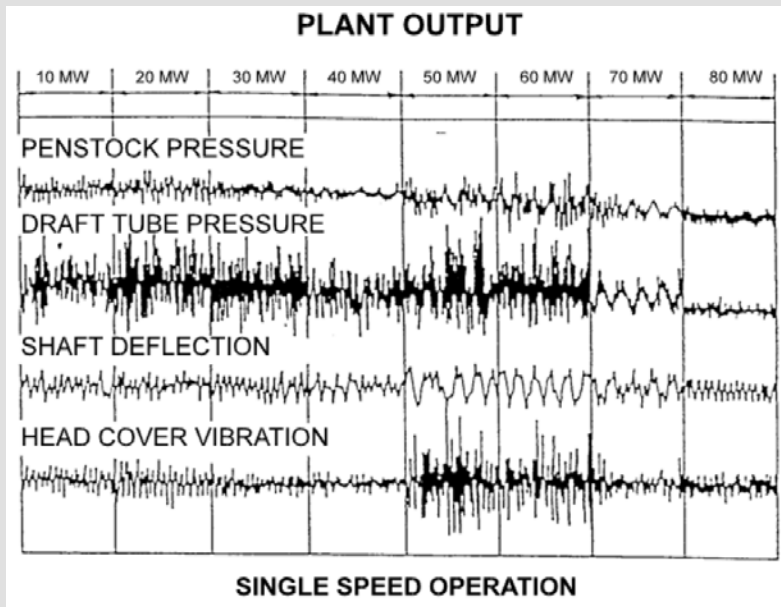
Variable Speed Operation

- Converter-fed synchronous machines (CFSM)
 - New design strategy to optimize generator
 - Challenges: vibration, losses
- Modeling, simulation and analysis of CFSM using FEM

Vibration of Hydro Generator

- Vibration due to the magnetic forces
- Vibration analysis using FEM
 - Important parameters, how to reduce.
 - Fault diagnosis using vibration signals





Thank you for your attention.