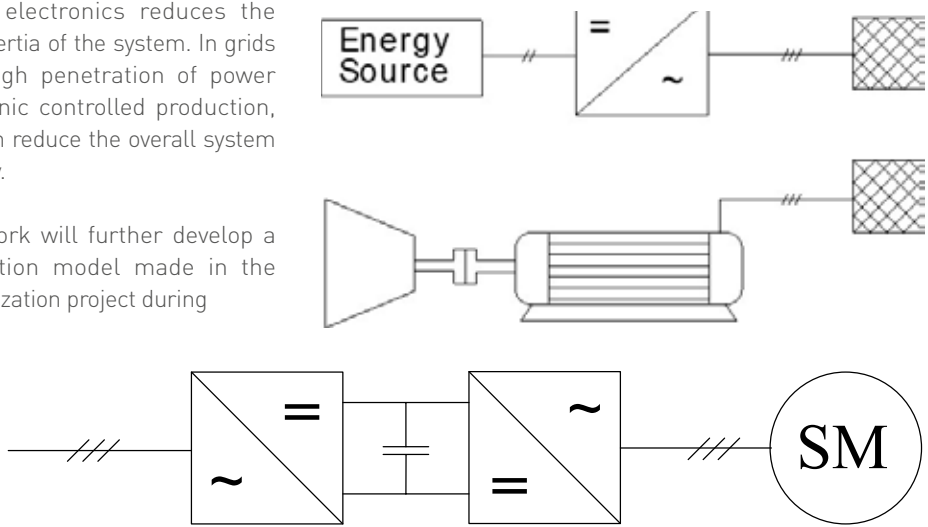
Background

Increasing integration of renewable energy sources in the electric power system raises the demand for balancing technologies to compensate for fluctuation in production. Of all the balancing technologies available, pumped hydropower is by far the most mature technology. In recent years, the interest for adjustable speed drives has increased due to the ability to adjust power consumption in pumping mode of hydro-electric power plants. However, decoupling generators from the grid using power electronics reduces the total inertia of the system. In grids with high penetration of power electronic controlled production, this can reduce the overall system stability.

This work will further develop a simulation model made in the specialization project during fall 2017. The system consists of a converter-fed synchronous machine connected to a weak grid. In the project work, inertia control strategies were developed and tested during a system disturbance. This master's thesis will aim to further developed these control strategies using principle of virtual synchronous machine, and other possible implementations discussed in the project work. If time and resources permits, this should also be tested in a laboratory set up.



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Synthetic inertia from a converter-fed synchronous machine in a hydro-electric power plant

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MASTER THESIS