

Control of a Hydraulic Wind Power Transfer System under Wind Disturbance

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The energy of wind can be transferred to the generator by employing a gearbox or through an intermediate medium such as hydraulic fluids. In this method, a high-pressure hydraulic system is utilized to transfer the energy produced from a wind turbine to a central generator. The speed control of wind driven hydraulic machinery is challenging, since the intermittent nature of wind imposes the fluctuation on the wind power generation and consequently varies the frequency of voltage. On the other hand, as the load of the generators increases, the frequency of the voltage drops. Therefore, hydraulically connected wind turbine and generator need to be controlled to maintain the frequency and compensate for the power demands. This poster introduces a closed loop control technique to maintain a constant frequency at the wind turbine generator. The governing equations of the renewable energy transfer system are derived and used to design the control system. The speed control profile obtained from a PI controller demonstrates a high performance speed regulation. The simulation results demonstrate the effectiveness of both the proposed model and the control technique

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