

# Lecture Series SoSe 2024

## 4th Lecture

**When?** 06.05.2024, 18 Uhr

**Where?** Nordstraße 2, 24937 Flensburg

at WETI (1&1 Building), Room V 1.12 or online via Webex

**Who?** Lucy Pao

World-Leading Scientist in Wind Turbine / Park Regulation

University of Colorado at Boulder

**What?** 30 minutes Lecture  
30 minutes Q&A

### Multi-Loop Control of Floating Wind Turbines

Established blade-pitch feedback controllers for land-based wind turbines do not necessarily perform well when applied to floating offshore wind turbines (FOWTs), because there is coupling between the floating platform motion and the generator-speed dynamics. Multi-loop feedback has been investigated to address the challenges of FOWT control, but the various auxiliary feedback architectures are rarely compared under a unified study.

Four multi-loop control approaches are analyzed in this work and evaluated for their ability to improve FOWT performance metrics, including power quality, generator-speed tracking, and structural loading. Each control law is analyzed in the context of closed-loop system stability using root locus methods and tuned using a frequency-based stability margin.



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