
Active Control of Large Aeroelastic Wind Turbine Models for Load Alleviation

Bing Feng Ng

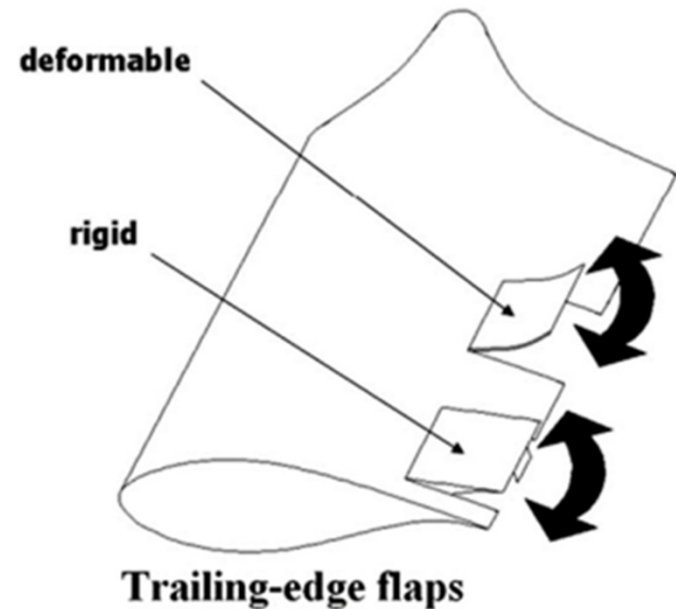
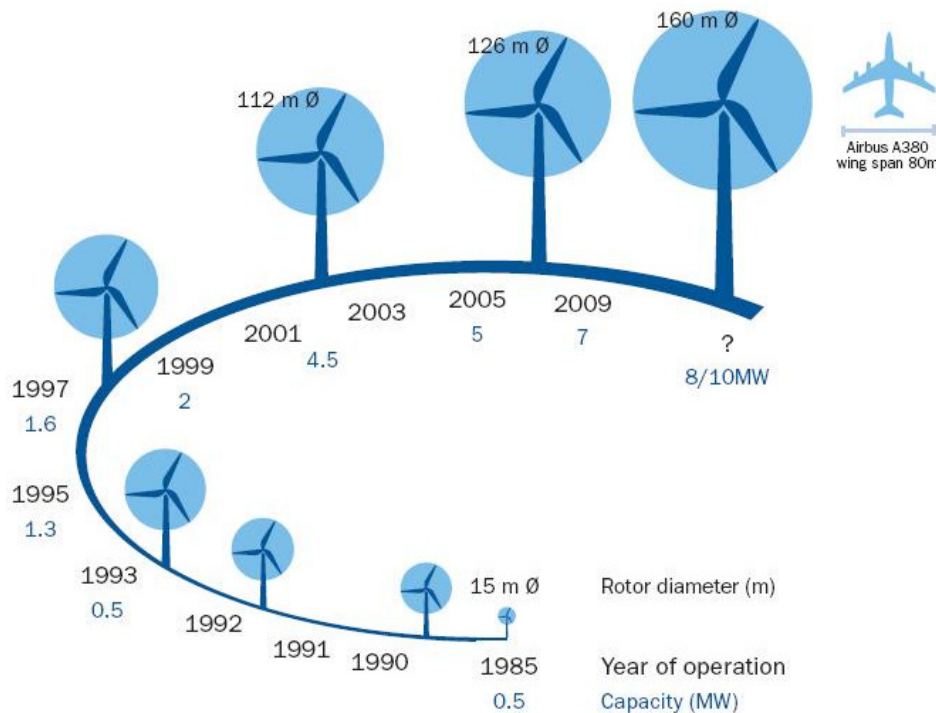
Rafael Palacios, J. Michael R. Graham, Eric C. Kerrigan

Imperial College London



Introduction

- Turbines - Larger, higher loadings.
- Require active control surfaces – flaps.

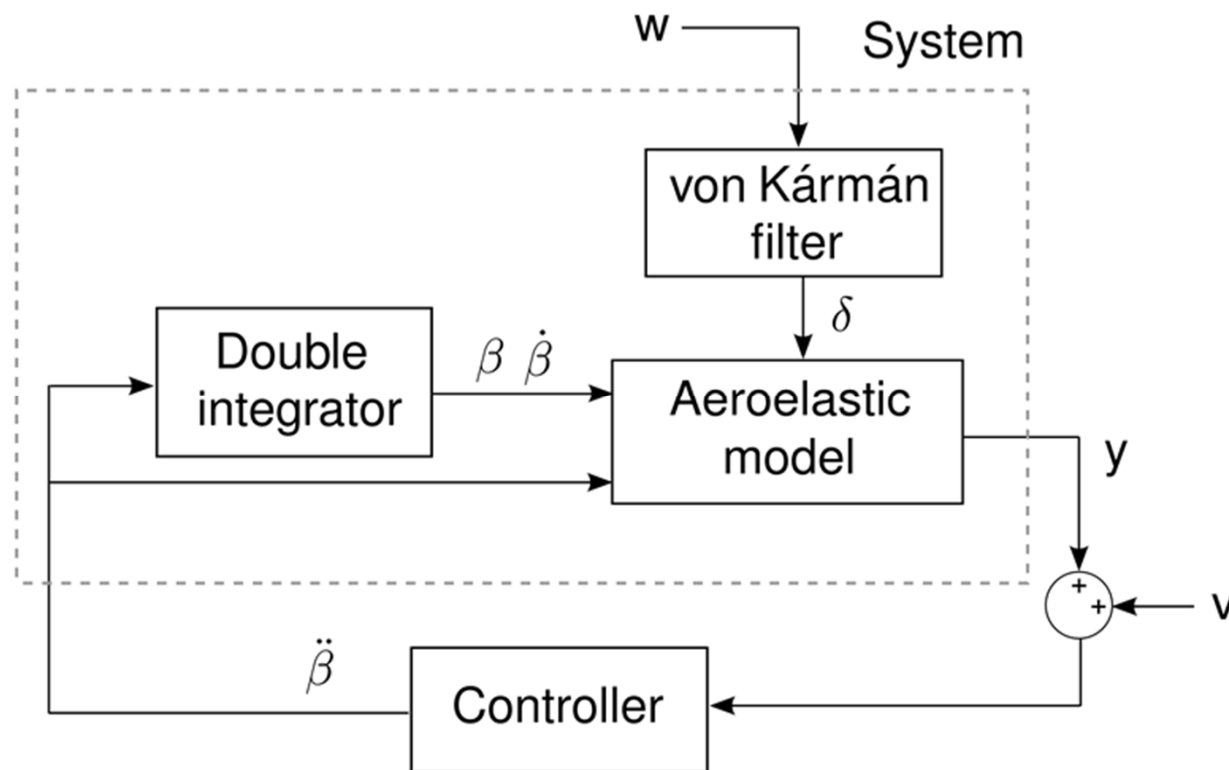


http://www.ewea.org/fileadmin/ewea_documents/documents/publications/factsheets/Factsheets.pdf

Barlas & Kuik (2010)

Modelling

- Vortex particle method with plunge-pitch aerofoil
- State-space form and tailored for controls

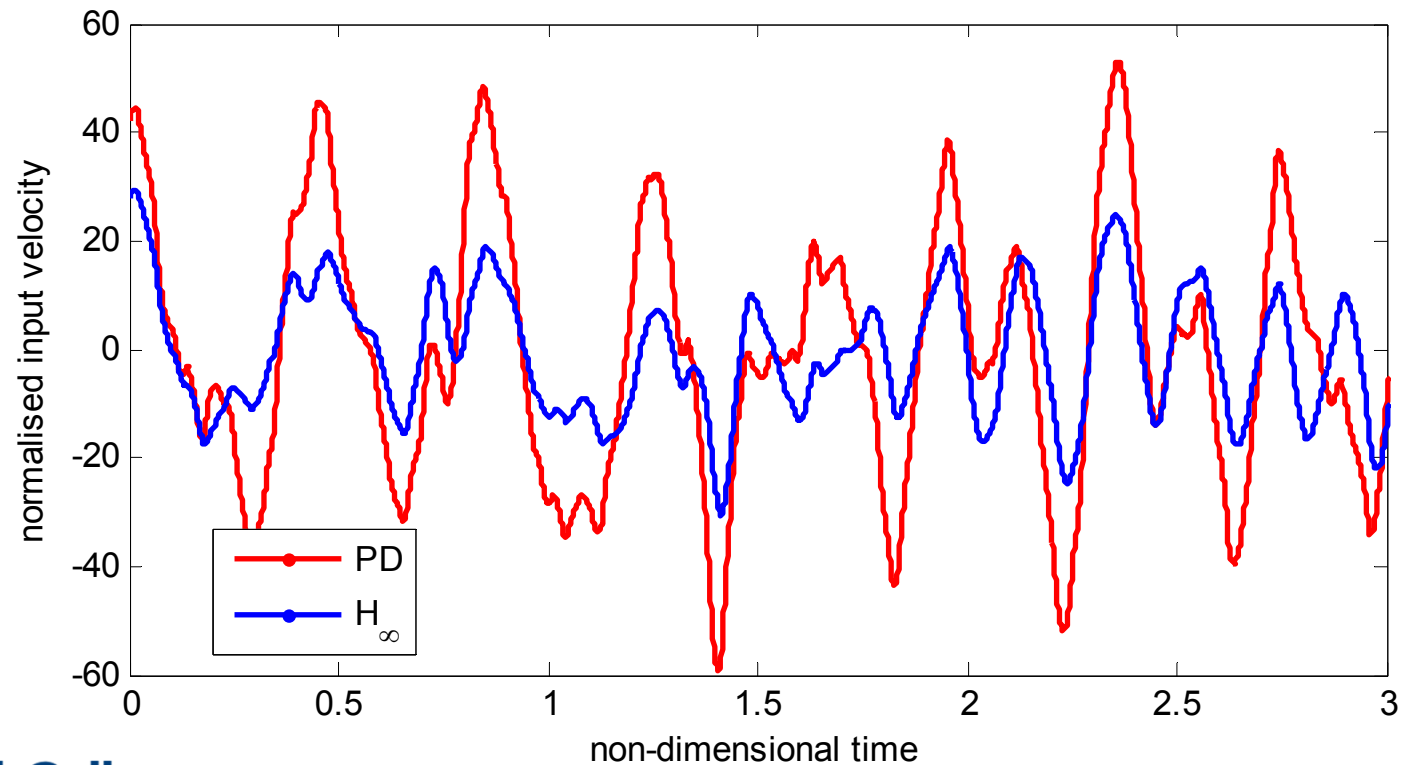


Numerical Results - Performance

Controller	% reduction in rms (C_L)
LQG	82%
H_∞	79%
PD	77%

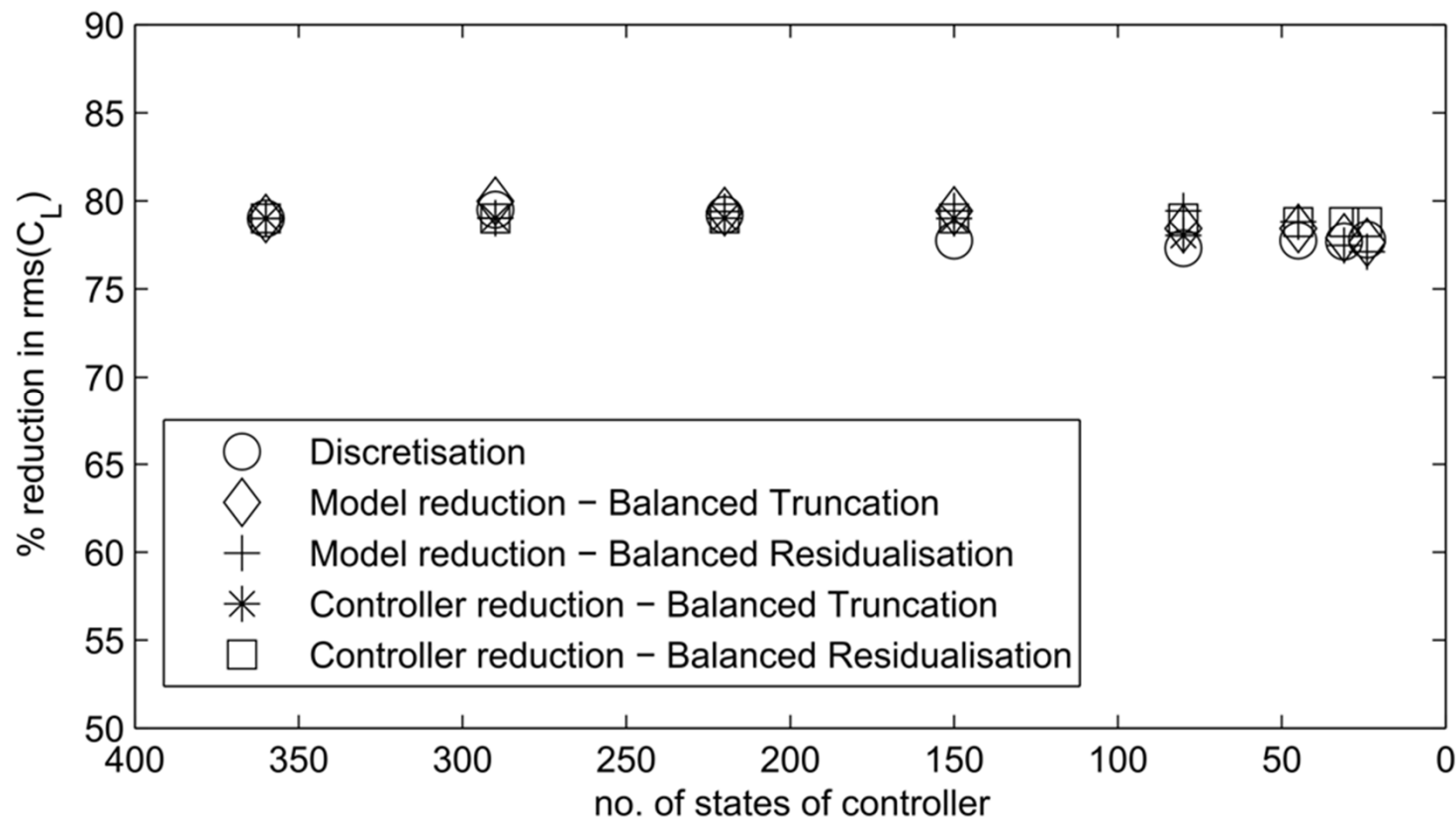
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Numerical Results - Discretisation

- Vortex panel requires dense spatial discretisation.
- Synthesize controller from spatially coarse models.



Conclusion

- Active aeroelastic control offers huge potential in load alleviation.
- Use of spatially coarse models for controller synthesis.

next

- Simulation of High Aspect Ratio Planes (SHARP).