

About us



Finn Matras

PhD

Multirotor systems



Morten D. Pedersen

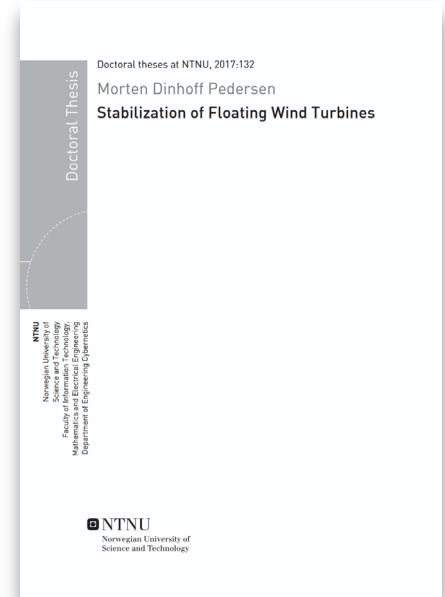
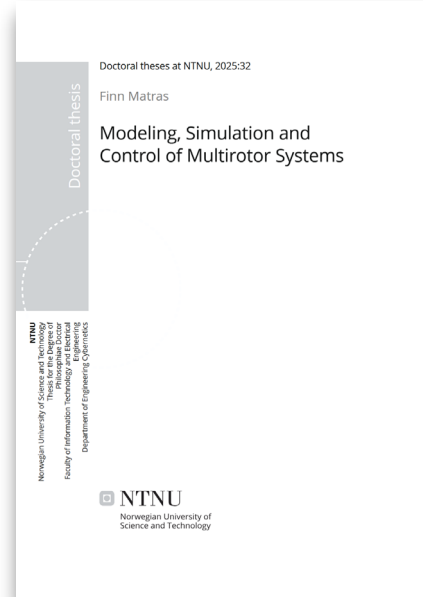
Associate Professor

Project engineer offshore wind

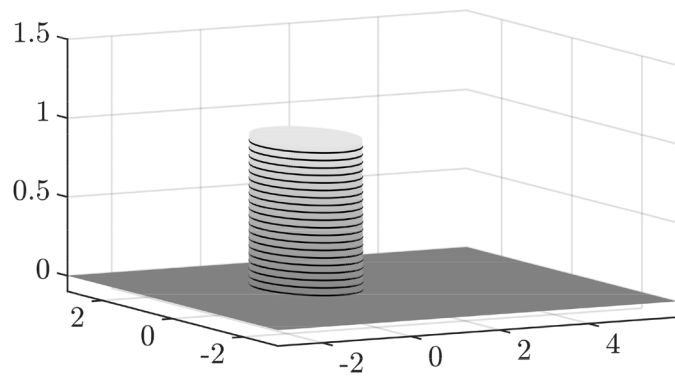


Faculty of Information Technology
and Electrical Engineering

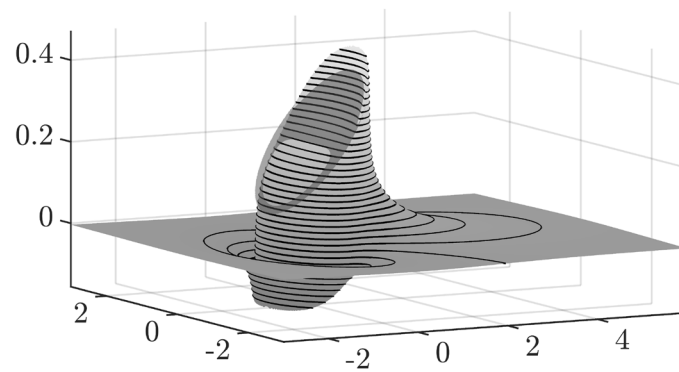
Department of Engineering
Cybernetics



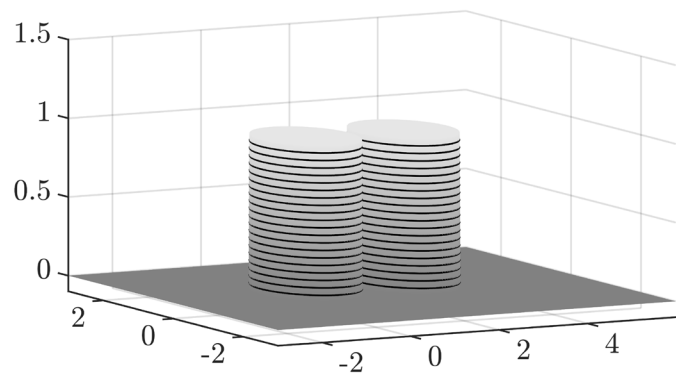
Thrust:



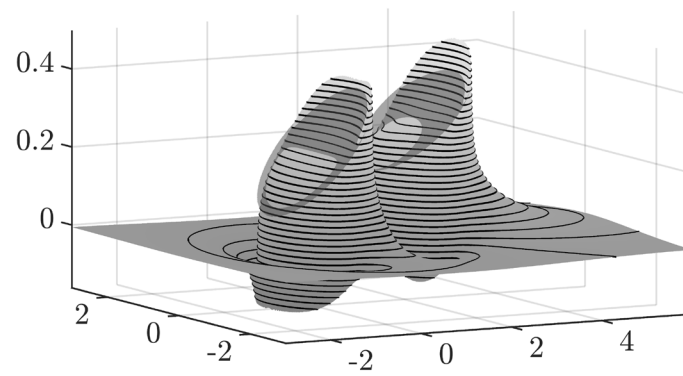
Inflow:



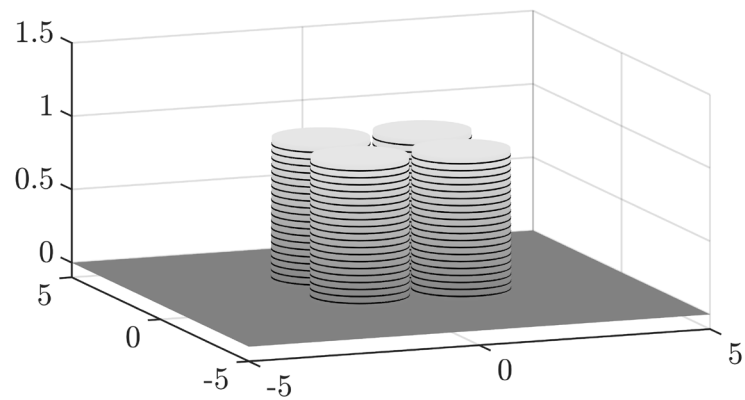
Thrust:



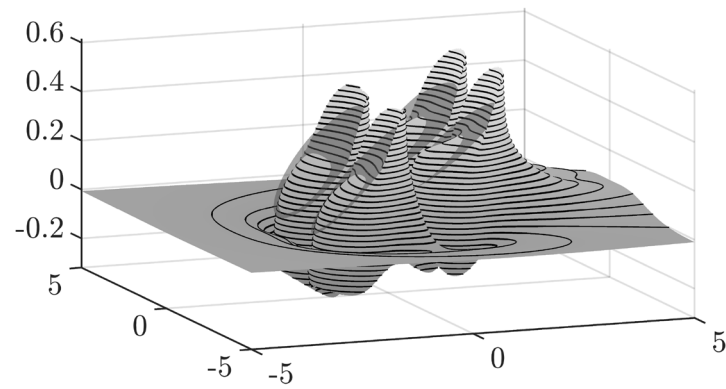
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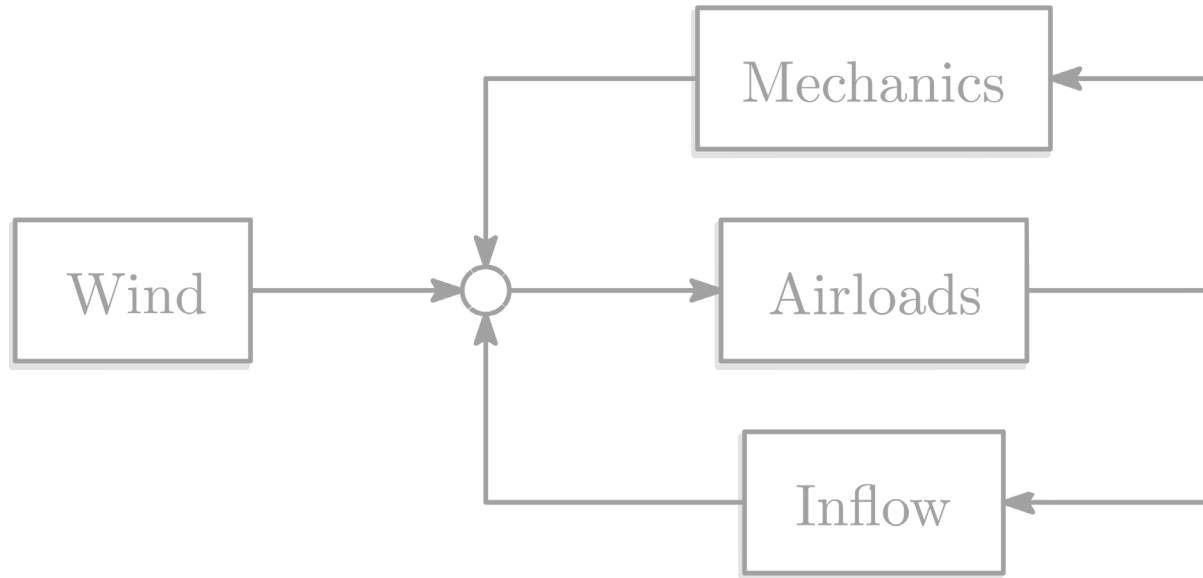
Thrust:



Inflow:



Approach



Beyond Single Rotors

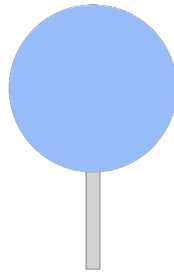
Enhancing Performance in Multi-Rotor Wind Turbines

Single Rotors vs. Multi-rotor

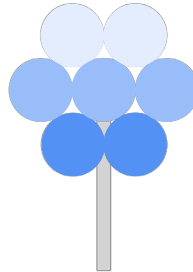
Wind field sampling



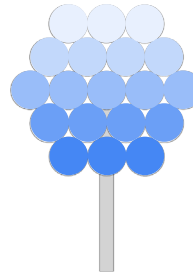
Wind field



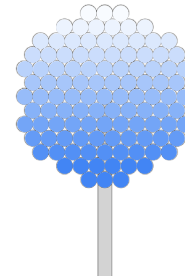
(a) 1 rotor.



(b) 7 rotors.

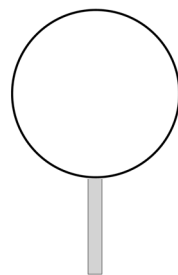


(c) 19 rotors.

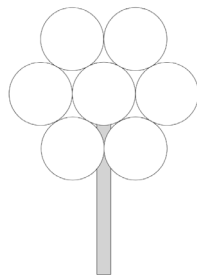


(d) 109 rotors.

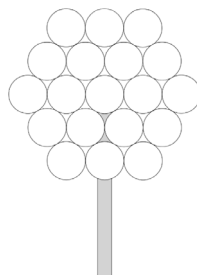
Single Rotors vs. Multi-rotor



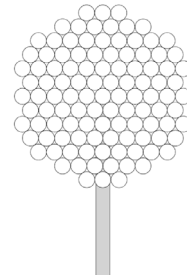
(a) 1 rotor.



(b) 7 rotors.



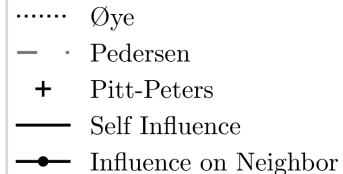
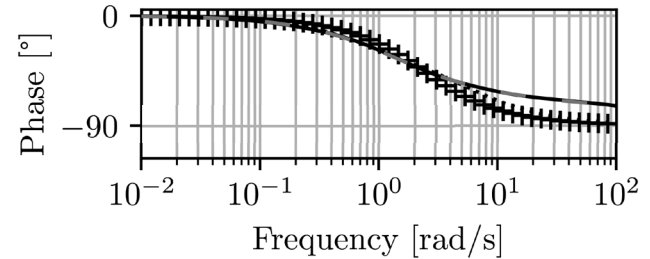
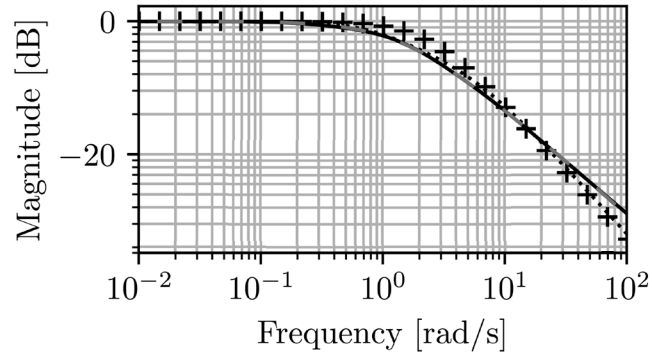
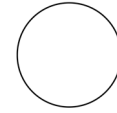
(c) 19 rotors.



(d) 109 rotors.

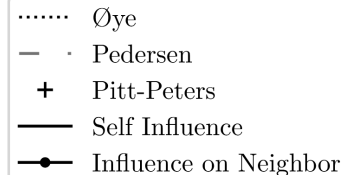
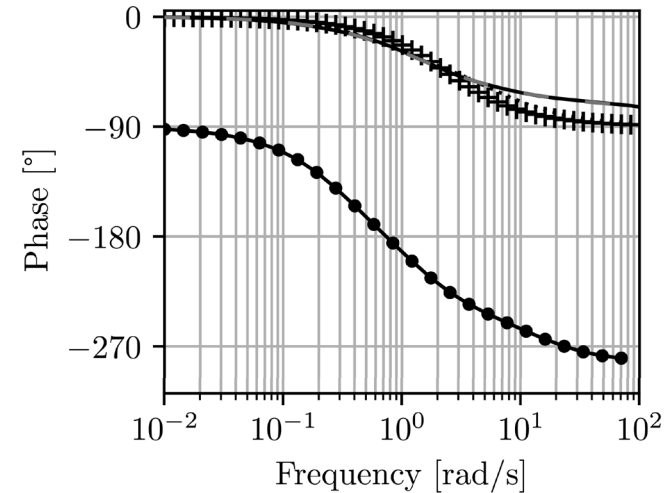
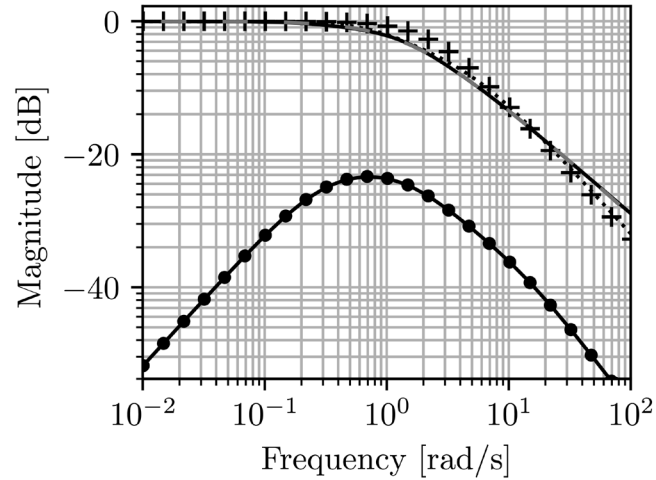
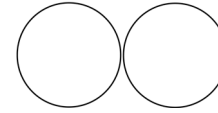
Single Rotors vs. Multi-rotor

Frequency response



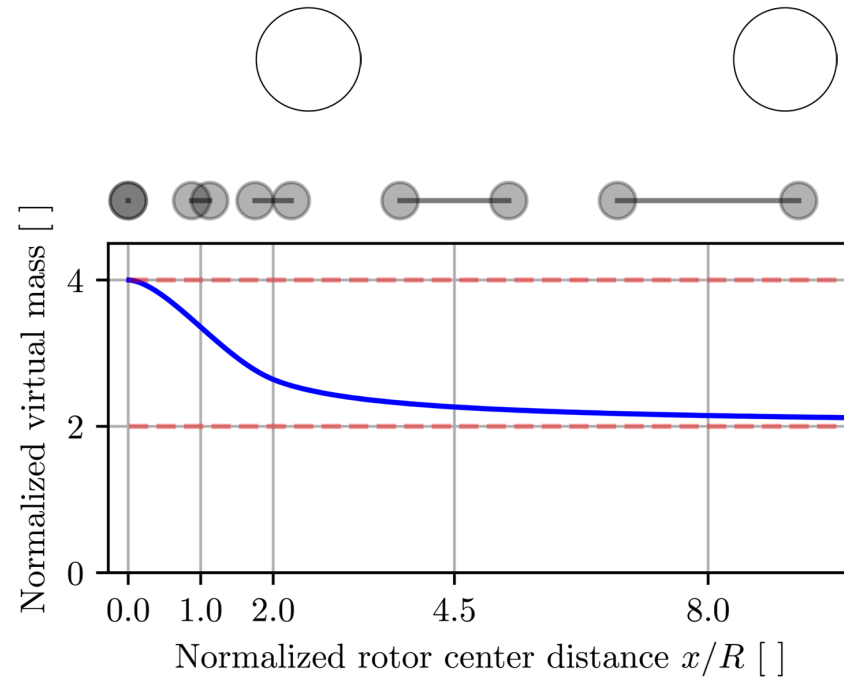
Single Rotors vs. Multi-rotor

Frequency response



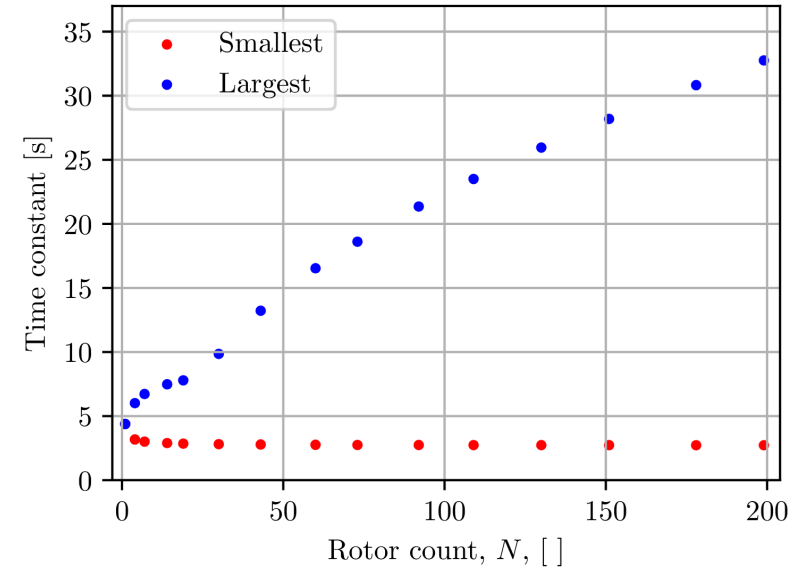
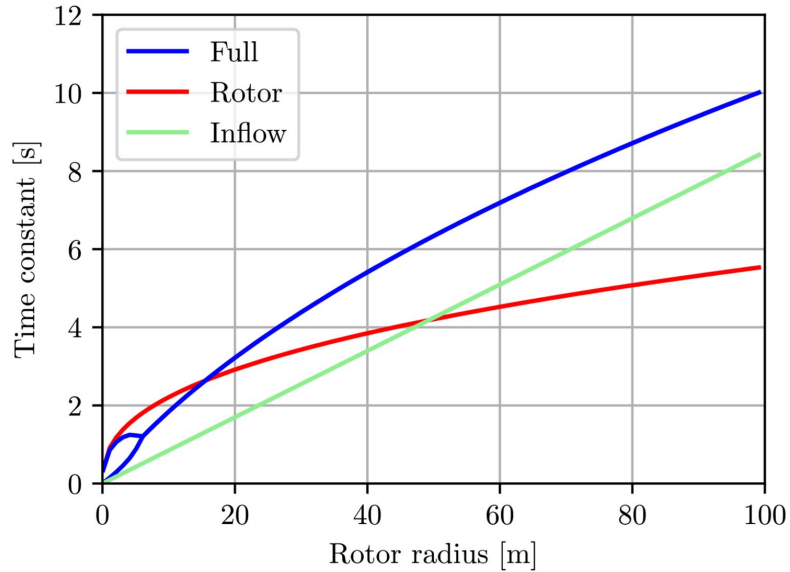
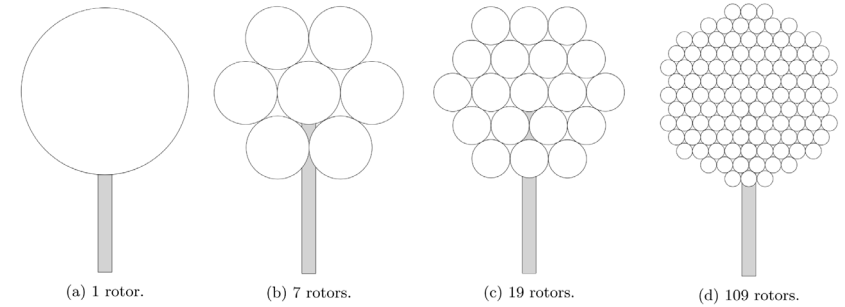
Single Rotors vs. Multi-rotor

Added mass

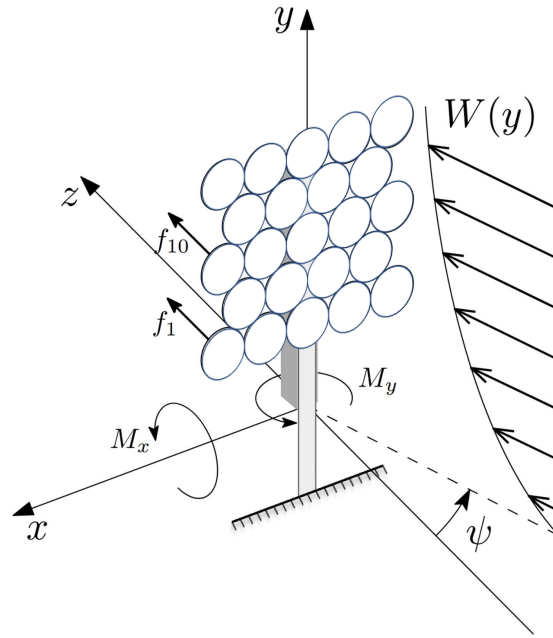


Single Rotors vs. Multi-rotor

Time constants

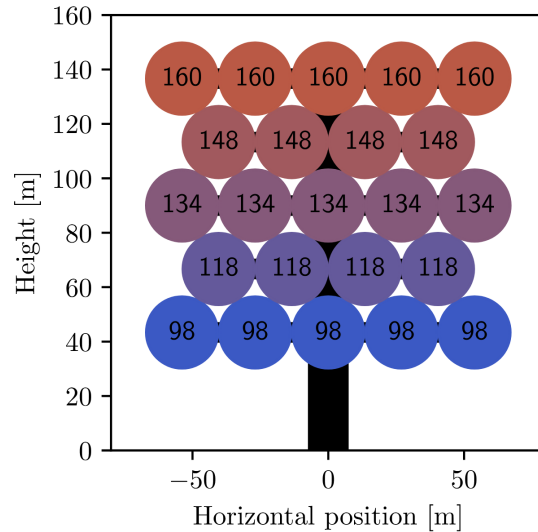


Multirotor Wind Turbine Example

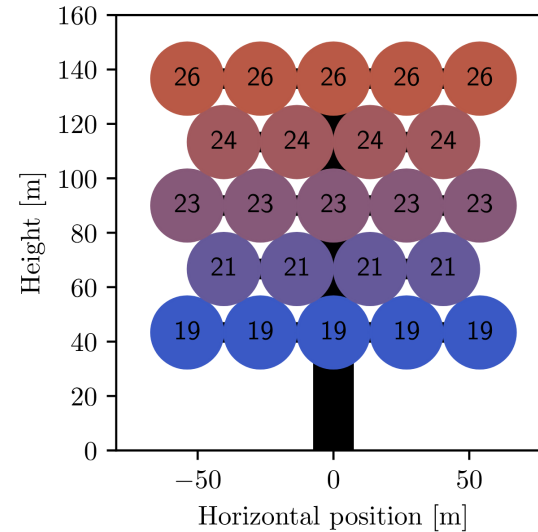


Multirotor Wind Turbine Example

Wind shear



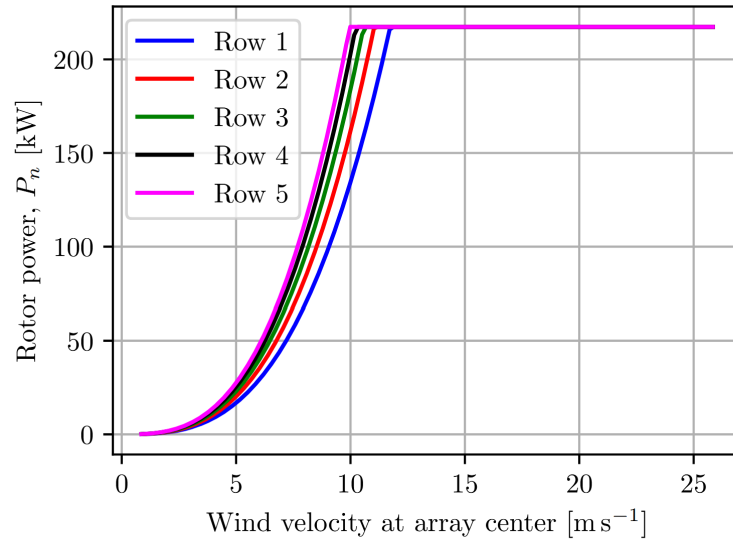
(a) Powers in kW



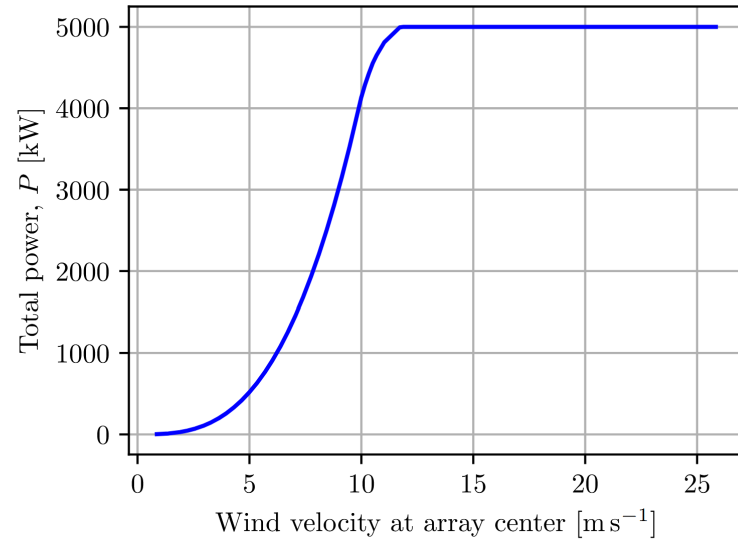
(b) Thrusts in kN

Multirotor Wind Turbine Example

Wind shear



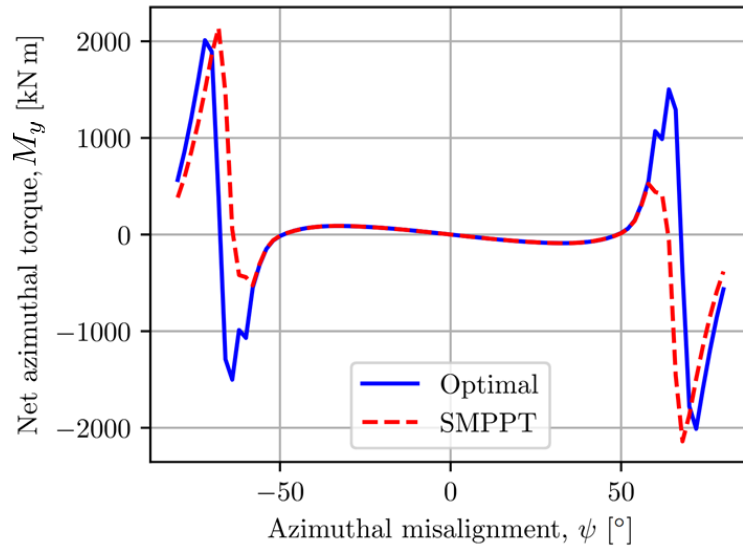
(a) Power per row.



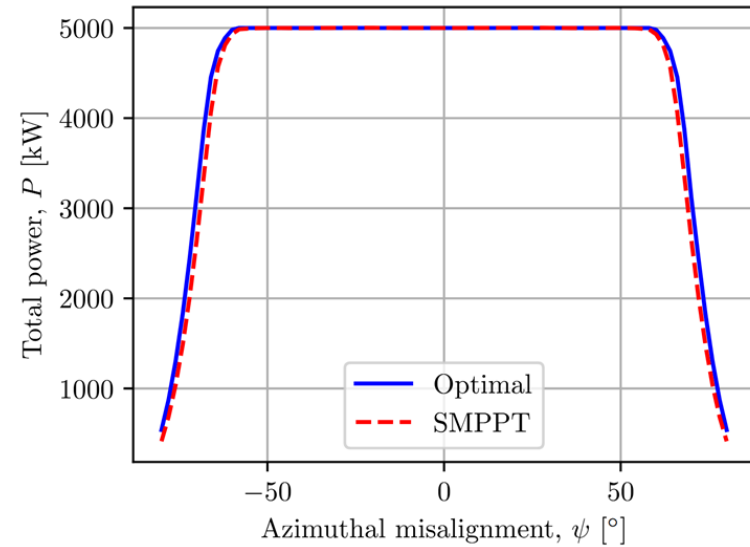
(b) Total power.

Multirotor Wind Turbine Example

Azimuthal stability



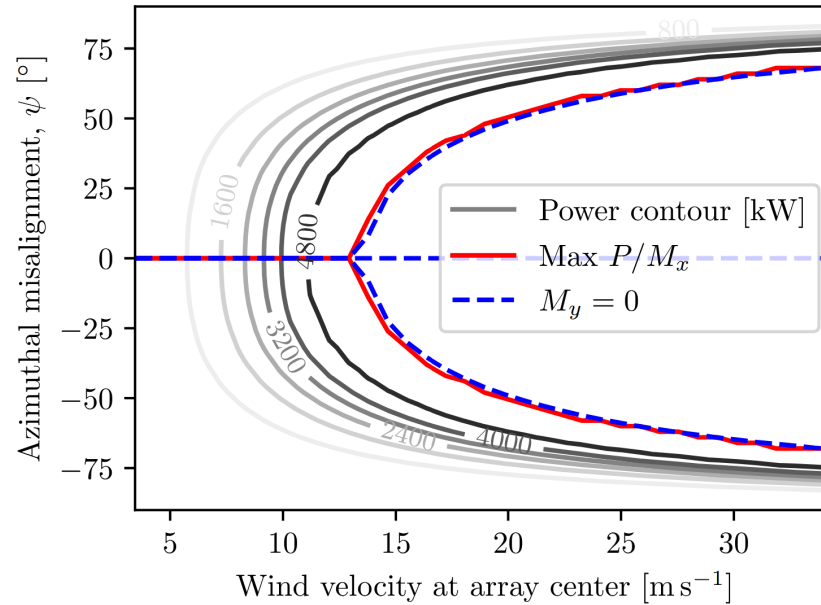
(a) Azimuthal torque.



(b) Power.

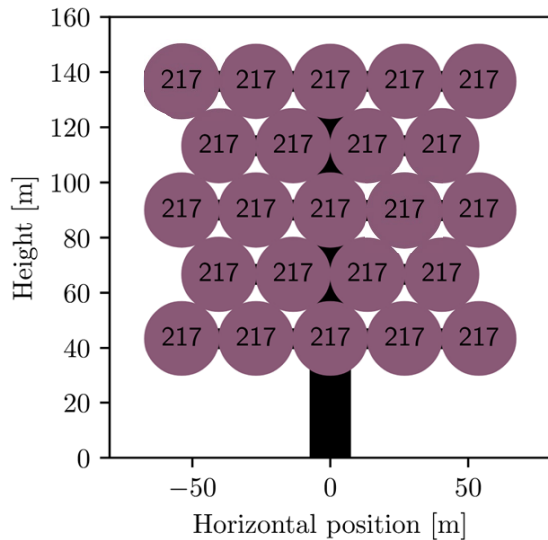
Multirotor Wind Turbine Example

Azimuthal control

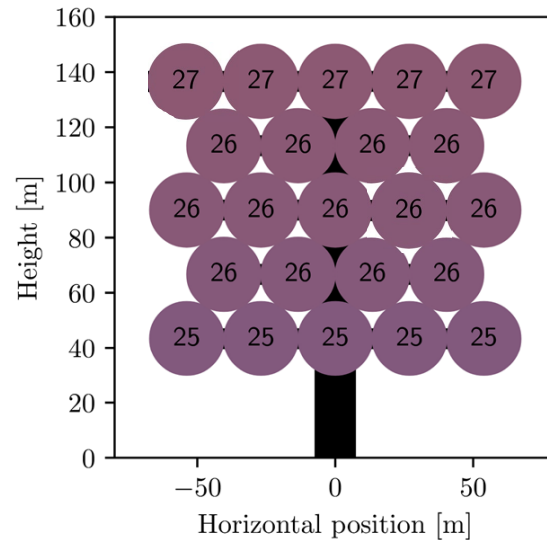


Multirotor Wind Turbine Example

Failure handling



(a) Powers in kW

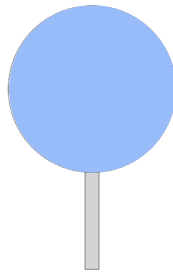


(b) Thrusts in kN

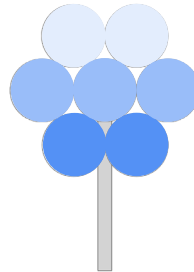
Summary



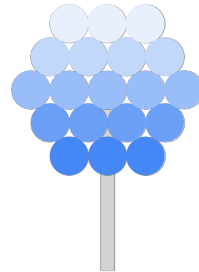
Wind field



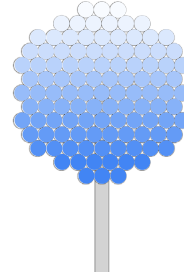
(a) 1 rotor.



(b) 7 rotors.



(c) 19 rotors.



(d) 109 rotors.



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