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Learning and extrapolation of wind turbine load models
Student Project Proposal

Background
The faster and faster development time of modern wind turbines requires faster and more accurate methods for estimating the loads and cost of next wind turbine upgrade. Further the size of wind turbine just seems to be bigger and bigger, but are they really cost optimal, as discussed in an article in Ingeniøren [1]?

Scope
The development of advanced control algorithms for modern wind turbine designs means that design loads depend not only on design choices which can be extracted from structural properties but critically also on control algorithm and parameter choices. The sensitivity to these parameters can be extreme and there can be many hundreds of parameters introducing complexity to the design process.

In this project it is proposed to use machine-learning techniques together with Vestas' large history of turbine design calculations in order to enable faster accurate predictions of future design points in order to further optimize the design of future wind turbines including the effects of control parameters.

Keywords:
Aero-elastic modelling, cost benefit analysis, machine learning, wind turbine design, wind turbine cost, load analysis.

[1]: https://ing.dk/blog/bliver-vindmoellerne-ved-med-at-vokse-del-192076