Aerodynamic investigation of winglets on wind turbine blades using CFD - DTU Orbit
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The present report describes the numerical investigation of the aerodynamics around a wind turbine blade with a winglet using Computational Fluid Dynamics, CFD.

Five winglets were investigated with different twist distribution and camber. Four of them were pointing towards the pressure side (upstream) and one was pointing towards the suction side (downstream). Additionally, a rectangular modification of the original blade tip was designed with the same planform area as the blades with winglets.

Results show that adding a winglet to the existing blade increase the force distribution on the outer approx 14 % of the blade leading to increased produced power of around 0.6% to 1.4% for wind speeds larger than 6 m/s. This has to be compared to the increase in thrust of around 1.0% to 1.6%. Pointing the winglet downstream increases the power production even further.

The effect of sweep and cant angles is not accounted for in the present investigation and could improve the winglets even more.

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