

BeamDyn – FAST integration

File Setup:

NREL's Test26 with the following changes:

- AeroDyn is turned off
- ServoDyn is turned off
- InflowWind is turned off
- ElastoDyn's DOFs are turned off

The turbine has pitch angle of 0 degrees and is running at 12.1 RPM.

Then, the case was run with initial azimuth angle of 0 degrees and with 120 degrees.

Code used:

NREL's FAST 8.16 July 2016 release, using double precision.

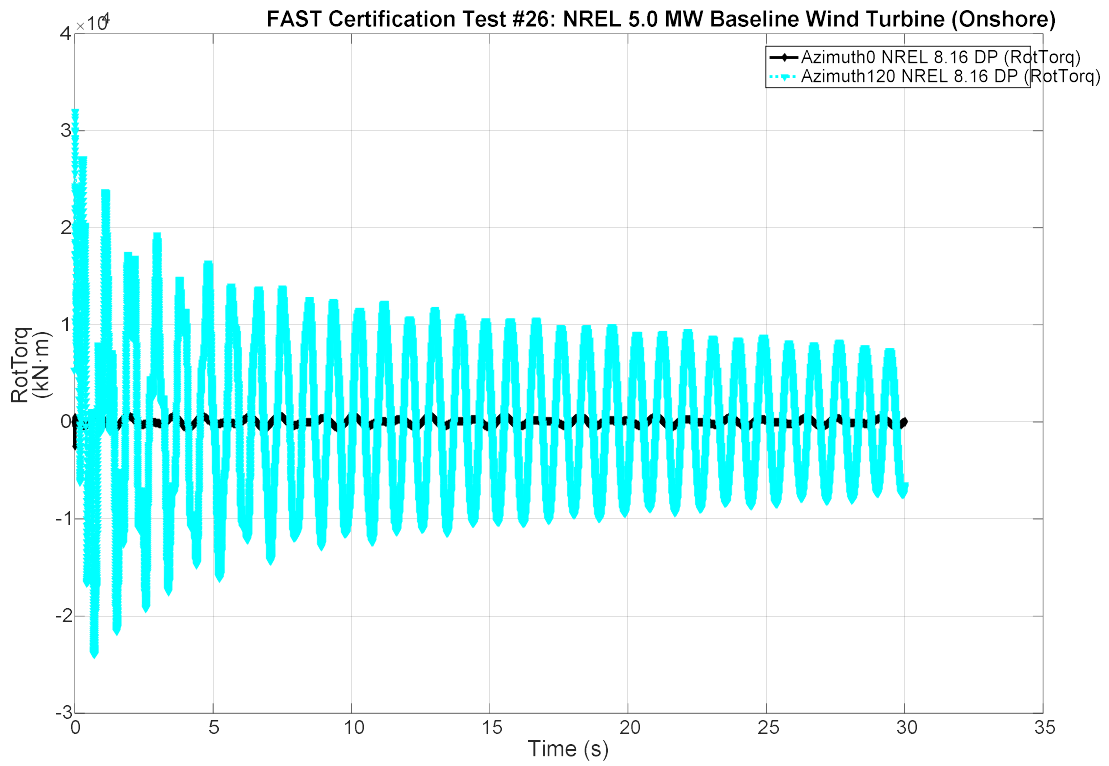
This is also a problem in the code Envision sent to NREL last fall so I assume this is reproducible in OpenFAST.

Comparison between initial azimuth angle of 0 and 120 degrees:

I would expect these two configurations to produce the same overall response, with the blade numbers switched. However, the following plots show that there is definitely something strange in the BeamDyn initialization.

The black lines show results with an initial azimuth of 0 in blade 1; the cyan lines show results from the 120-degree initial blade 1 azimuth. It is interesting that even in the 0-degree initial azimuth case, the RootMxr signals for blades 2 and 3 show higher frequency content than blade 1.

Rotor torque:



Blade root moments (in X):

