

Spline Check for mAEWing1 FEM v5.2

Sep 12, 2018

mAEWing1 FEM v5.2

To check SPLINE used in SOL 144 for coupling aerodynamic/structural motions. The SPLINE used in SOL 144 are copied to SOL 145 for flutter analysis check and generating aerodynamic mode shapes.

- ❑ Control surface models are added in SOL 144 files for trim analysis.
- ❑ The Aero/structural motion spline used in SOL 144 are moved to SOL 145 files to generate the aerodynamic mode shapes.

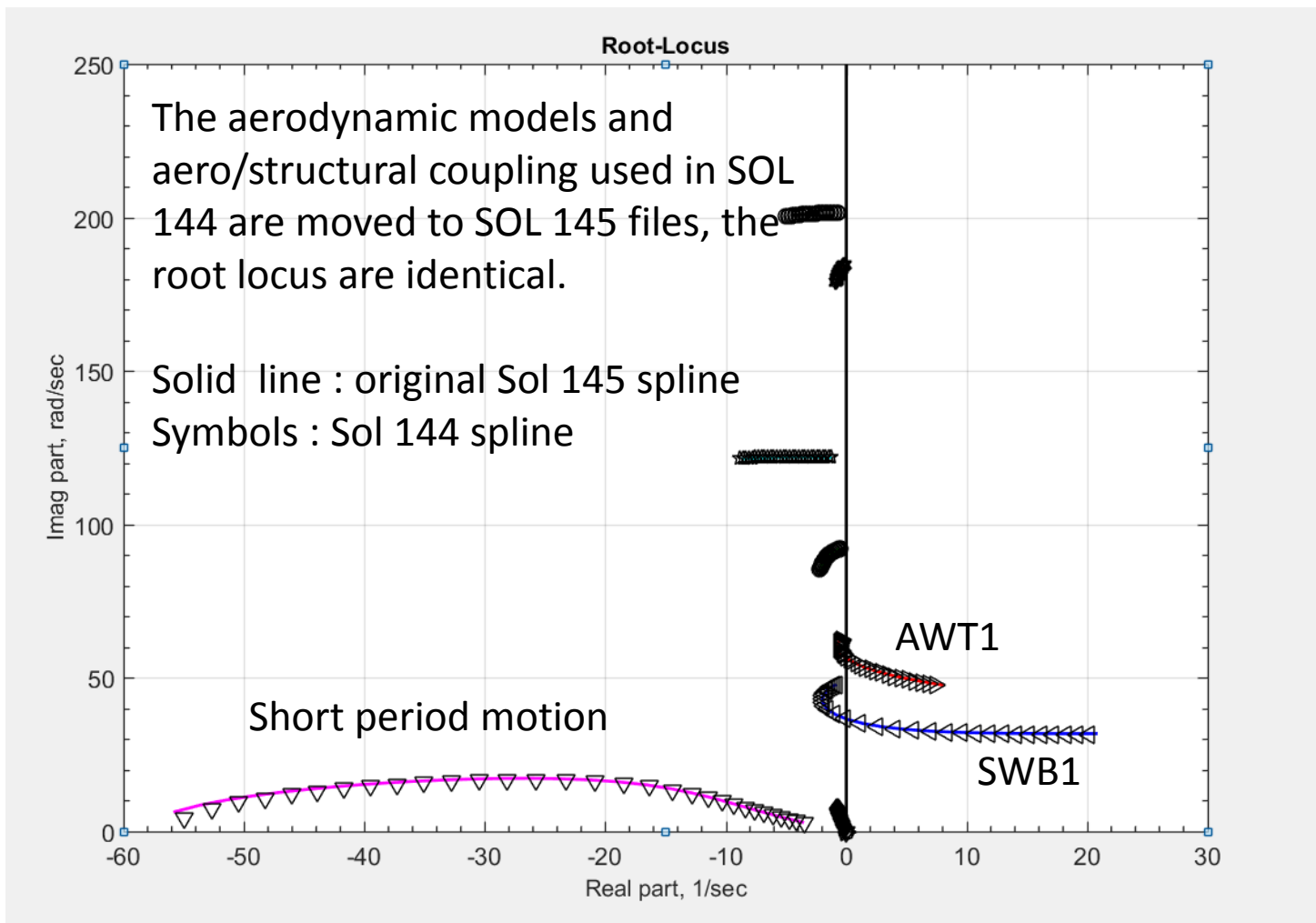
Original NASTRAN SOL 145 files – Flutter Analysis

<https://github.com/PAAW/mAEWing1/tree/master/Design/FEM/FEM%20v5.2/NASTRAN%20files>

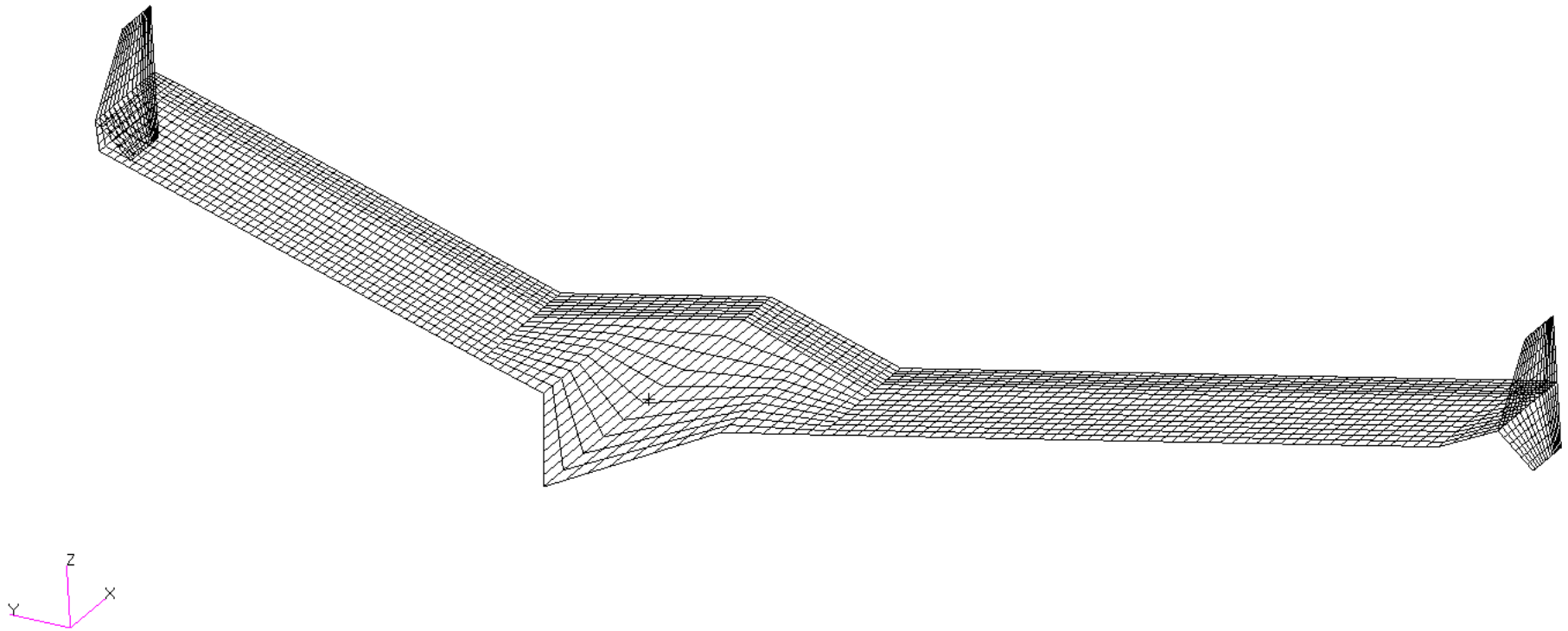
NASTRAN SOL 144 files – Trim Analysis

[https://github.com/PAAW/mAEWing1/tree/master/Design/FEM/FEM%20v5.2/NASTRAN Trim SOL144](https://github.com/PAAW/mAEWing1/tree/master/Design/FEM/FEM%20v5.2/NASTRAN%20Trim%20SOL144)

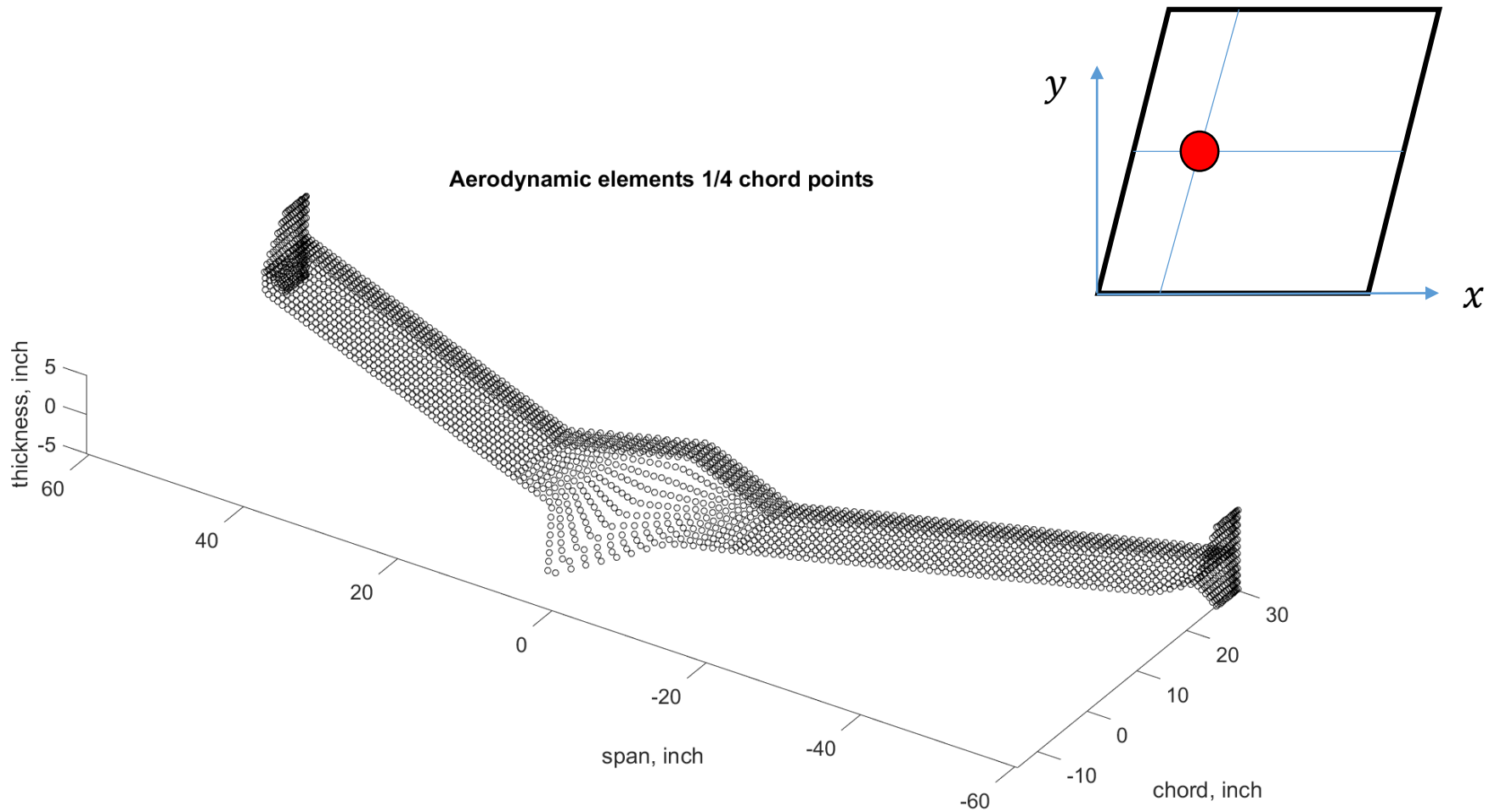
Root locus at these two splines are same



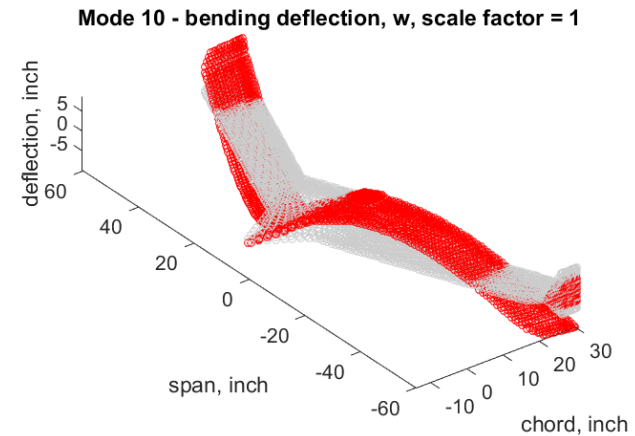
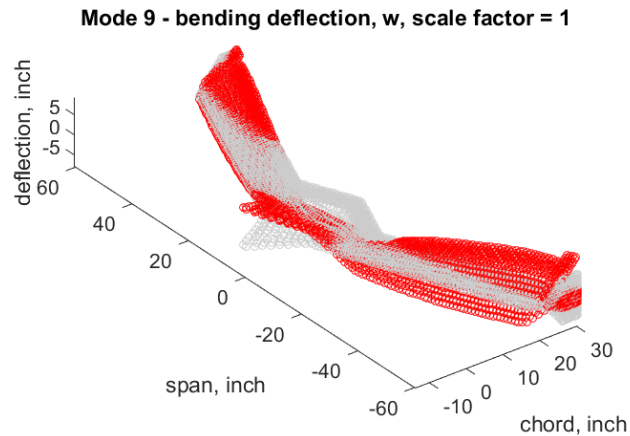
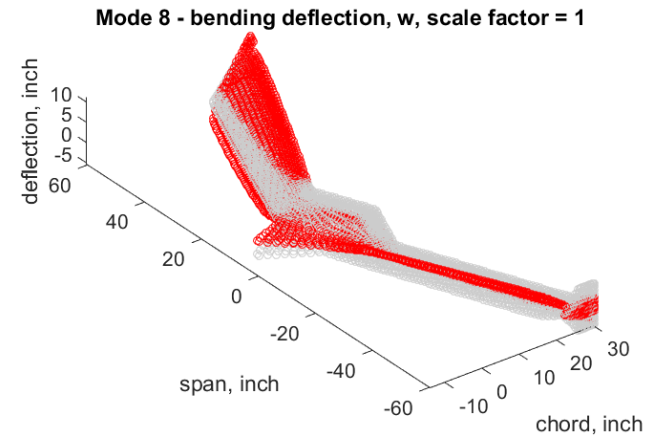
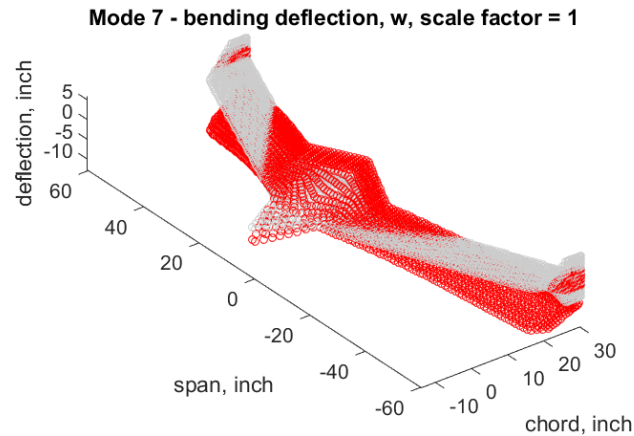
NASTRAN DLM mesh



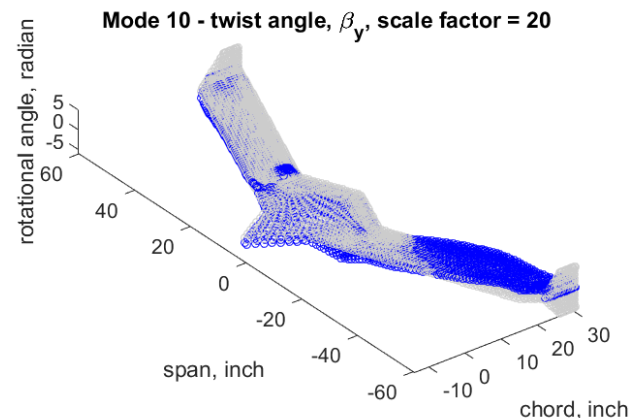
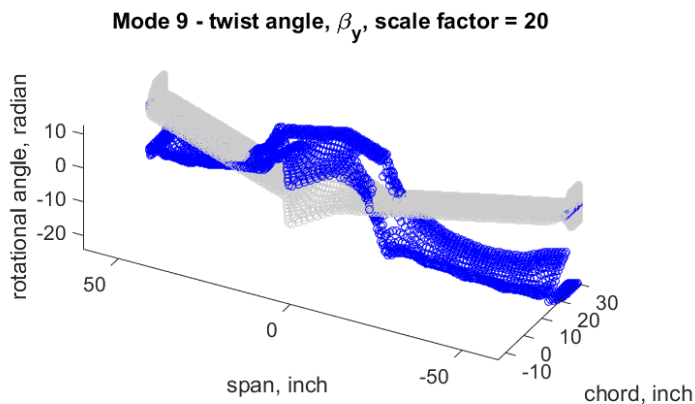
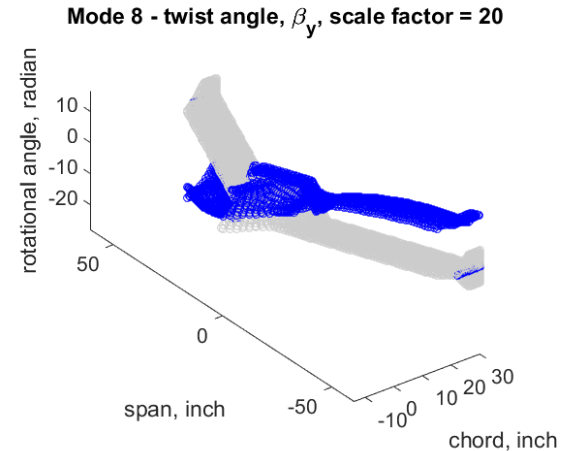
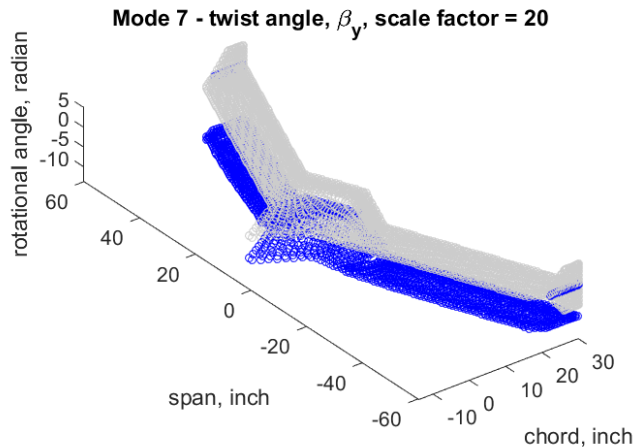
$\frac{1}{4}$ chord points in DLM mesh



Bending deflections (Modes 8-10) in DLM elements



Torsional rotations (Modes 8-10) in DLM elements



Summary

- Continuous and smooth mode shapes for bending deflection in aerodynamic mesh
- Continuous but not smooth mode shapes for torsion angles in aerodynamic mesh

All files can be found in

[https://github.com/PAAW/mAEWing1/tree/master/Design/FEM/FEM%20v5.2/NASTRAN Trim SOL144](https://github.com/PAAW/mAEWing1/tree/master/Design/FEM/FEM%20v5.2/NASTRAN%20Trim%20SOL144)