Exercise 03

MEE556 Aeroelasticity

Consider a torsionally elastic ($GJ = 40$kN m^2) wind tunnel model of a unifom wing, the ends of which are rigidly fastened to the wind tunnel walls. The model has a smmetric aerofoil, a span of 1.50 m, and a chord of 0.20 m. The sectional lift-curve-slope is 6 rad^{-1}. The aerodynamic centre is located at the quarter-chord, and both the mass centroid and the elastic axis are at the mid-chord.

Answer the following questions:

1. Calculate the divergence dynamic pressure

2. Calculate the divergence airspeed at sea level

3. How would you double the divergence dynamic pressure by (a) changing the torsional stiffness of the wing or, (b) relocating the elastic axis