Active Warping Control For Damping Of Torsional Beam Vibrations

This paper considers damping of torsional beam vibrations by active control of the axial warping displacements. A beam element with active positive position feedback (PPF) is set up with an additional flexibility parameter. This arises from partial restraining of warping caused by discrete actuators. The flexibility lowers the frequency associated with an infinite actuator gain and thereby the attainable damping ratio. It is shown how it furthermore affects the stability limit. Results are compared with three-dimensional finite element results, with multiple actuators acting on an end cross-section of the beam. The accuracy of the beam model is justified by an example which shows that substantial damping ratios may be achieved by active warping control.