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Comparative Study of Reynolds Averaged and Embedded Large Eddy Simulations of a High-Pressure Turbine Stage SAMUEL JONES, THOMAS CORKE, ALEKSANDAR JEMCOV, University of Notre Dame — An Embedded Large Eddy Simulation (ELES) approach is used to simulate the flow path through a high-pressure turbine stage that includes the entry duct, stationary inlet and exit guide vanes, and a rotor. The flowfield around the rotor is simulated using LES. A Reynolds Averaged Simulation (RAS) is used for the rest of the flow domain. The interface between RAS and LES domains uses the RAS turbulence quantities as a means of obtaining length scales that are used in computing the vorticity required to trigger a proper energy cascade within the LES part of the flow field. The objective is to resolve the unsteady vortical motions that emanate from the gap between the rotor tip and duct walls that are presumably under-resolved in a RAS approach. A comparative analysis between RAS and ELES approaches for this turbomachinery problem is then presented.

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