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**Computational study of a High Pressure Turbine Nozzle/Blade Interaction** JAMES KOPRIVA, GREGORY LASKOWSKI, GE Aviation, REZA SHEIKHI, Northeastern University — A downstream high pressure turbine blade has been designed for this study to be coupled with the upstream uncooled nozzle of Arts and Rouvroit [1992]. The computational domain is first held to a pitch-line section that includes no centrifugal forces (linear sliding-mesh). The stage geometry is intended to study the fundamental nozzle/blade interaction in a computationally cost efficient manner. Blade/Nozzle count of 2:1 is designed to maintain computational periodic boundary conditions for the coupled problem. Next the geometry is extended to a fully 3D domain with endwalls to understand the impact of secondary flow structures. A set of systematic computational studies are presented to understand the impact of turbulence on the nozzle and down-stream blade boundary layer development, resulting heat transfer, and downstream wake mixing in the absence of cooling. Doing so will provide a much better understanding of stage mixing losses and wall heat transfer which, in turn, can allow for improved engine performance. Computational studies are performed using WALE (Wale Adapted Local Eddy), IDDES (Improved Delayed Detached Eddy Simulation), SST (Shear Stress Transport) models in Fluent.

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