Analyzing the Final Examination of Melissa Harris for the degree of Master of Science

Time & Location: October 31, 2011 at 10:00 AM in ENGR 2 202
Title: Purge and Secondary Flow Interaction Control by Means of Platform Circumferential Contouring

This study presents an attempt to reduce the losses produced by interaction between purge flow and main flow in a turbine stage by incorporating circumferential platform contouring. Two contours are proposed and compared against a baseline at different levels of swirl. The computational simulations were performed using a RANS three-dimensional Computational Fluid Dynamics code with the Shear Stress Transport turbulence model. The results of steady simulations demonstrate that for the first contour, when the flow is swirled to 50% of the rim speed, the purge flow exits the cavity with less cross flow. This in turn reduces the strength of the passage vortex. However, at swirl extremes of 0% and 100% the baseline has the best performance. The results show that a carefully designed platform has the potential to reduce losses when the operating condition is in the proximity of 50% swirl.

Major: Mechanical Engineering

Educational Career:
Bachelor's of Aerospace Engineering, BS, 2009, University of Central Florida

Committee in Charge:
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Approved for distribution by Jayanta Kapat, Committee Chair, on October 1, 2011.

The public is welcome to attend.