

# Analytical Prediction Techniques for Axisymmetric Flow in Gas Labyrinth Seals

**U. Yucel and J. Y. Kazakia**

Lehigh University, Department of Mechanical  
Engineering and Mechanics, 19 Memorial Drive West,  
Bethlehem, PA 18015-3085

*Labyrinth seals are commonly found in turbines and compressors. Their objective is to control gas leakage from high pressure regions to low pressure regions. The correct prediction and control of this leakage is crucial for the efficient and economic operation of turbomachinery. In this paper we present approaches for obtaining the above prediction in a simple analytical and explicit method. Both constant and pressure dependent flow coefficients are incorporated in the present study which extends to the higher inlet/outlet pressure differences. The results obtained with our methods compare favorably with the ones obtained by both numerical and experimental techniques. In many cases there is hardly a distinction between our results and the numerical prediction. DOI: 10.1115/1.1340630*