

Analysis and Modelling of Turbulence in Rotating Flow

Paul Durbin*
Iowa State University

Greg Laskowski
General Electric Global Research

20 September 2010

Contents

1	Introduction	3
2	Simulations of rotating turbulence	4
2.1	Grid turbulence	5
2.2	Homogeneous shear	8
2.3	Plane channel	11
2.4	Serpentine channel	14
3	Stability of homogeneous flow	18
4	Transforming Reynolds stress models	23
5	Rotation in 2-equation models	25
5.1	Description of bifurcation	25
5.2	Equilibria of k - ϵ	26
5.3	Modified coefficients	29
5.4	Bifurcation	32

*funded in part by NASA grant NNX07AB29A, Dr. Chunil Ha, program manager