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Turbulent shear layers in confining channels[1] GRAHAM BENHAM, ALFONSO CASTREJON-PITA, IAN HEWITT, COLIN PLEASE, University of Oxford, ROB STYLE, ETH Zurich, PAUL BIRD, None — The development of shear layers are ubiquitous in a wide range of situations, from diffusers, nozzles, turbines and ducts to urban air flow and geophysical flows. In this talk we present a simple model for the development of shear layers between flows that mix in confining channels. The model, comprising two plug flow regions separated by a linear shear layer, shows good agreement with both laboratory experiments and computational turbulence modelling (at a fraction of the computation time). Such efficient models, capable of capturing and exhibiting the main characteristics of the turbulent shear layers, are expected to be useful for both modelling and design purposes. We demonstrate the latter by showing how the model can be utilised to optimise pressure recovery in diffusers with non-uniform inflows.

[1]EPSRC Centre for Doctoral Training in Industrially Focused Mathematical Modelling, VerdErg Renewable Energy Limited, John Fell Fund (Oxford University Press)

Graham Benham
University of Oxford

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