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Nonlinear Equilibrium States in Growing Boundary Layers
PHILIP HALL, KENGO DEGUCHI, Imperial College — Recently there has been much interest in vortex wave interaction/self sustained process/coherent structures in fully developed flows. In growing boundary layers the local Reynolds number varies in the flow direction and so the relevance of equilibrium states calculated for developed flows is in doubt. Here results are presented for nonlinear states in quite general boundary layers. Some of the structures we find using asymptotic and numerical methods are "distant cousins" of structures found in for example Couette flow whilst others are apparently unrelated. The new states are completely dependent on the background state being a boundary layer and are found have an elegant canonical asymptotic form. The new states are shown to be valid for quite general boundary layers; in addition they are related to experimental observations.

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