Vortex-Wave interaction in plane Poiseuille flow LIAM DEMPSEY,
ANDY WALTON, PHILIP HALL, Imperial College London — Our main interest is
in the process of transition to turbulence at high Reynolds numbers in the flow in a
plane channel. We will consider the basic flow to be driven by a uniform streamwise
pressure gradient (plane Poiseuille flow). We will formulate a high Reynolds number
asymptotic structure in the form of a nonlinear vortex-Tollmien-Schlichting-wave
interaction (VWI)- or so-called self sustaining process. We look for starting solutions
for the VWI by performing a weakly nonlinear analysis close to the lower branch
neutral point and seek equilibrium solutions of the resulting nonlinear amplitude
equation. We provide numerical solutions of the interaction equations which are
localised in the spanwise direction at large enough amplitudes.

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