Identifying Orr-like behaviour in full-scale turbulent wall-bounded flows[1] MIGUEL P. ENCINAR, JAVIER JIMENEZ, Technical University of Madrid — The presence of linear, transient phenomena in fully developed non-linear turbulence is studied in the sense of relating the growth of the intensity of wall-normal velocity perturbations with their inclination angle. This phenomenon is predicted by the Orr-Sommerfield equation, and can explain the formation of the energy-containing scales when paired with the lift-up mechanism. This process has been previously identified in minimal channels in which structures are represented by individual Fourier modes, and is generalised here to extended ones that contain many individual structures at different scales and stages of development. We present a method based on wavelet projection that addresses both spatial and spectral locality. After filtering the flow with a given wavelet, a local optimum wavelength and wavefront inclination is computed at each point of the filtered flow, and used to trace the Orr-like behaviour. The relation of the measured perturbations with the rest of the flow properties is explored, showing good agreement with the predictions of the Orr mechanism.

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