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A simple model of inertial layer dynamics in turbulent boundary layers[1] JUAN CUEVAS, ALIREZA EBADI, CHRISTOPHER WHITE, GREGORY CHINI, JOSEPH KLEWICKI, University of New Hampshire — Observations (e.g. Meinhart & Adrian, Phys. Fluids., **7**, 694 (1995)) indicate that the inertial region of turbulent wall-flows consists of uniform momentum zones segregated by narrow vortical fissures. Multiscale analysis similarly reveals that the mean momentum equation admits a scaling layer hierarchy across the inertial region. Here, each layer increases in width with wall-normal distance, but the inner-normalized velocity increment remains fixed. The talk reports on a simple model that captures the essential elements of these observations and the theoretical scalings. In this model, the number of fissures is specified to satisfy the average total velocity increment across the inertial layer, while the average wall-normal locations of the fissures and their widths are informed by the theory. Ensembles of statistically independent instantaneous velocity profiles are then created by simply allowing the fissures to randomly displace in the wall normal direction. Results indicate that the model identically recovers a logarithmic mean profile, produces a logarithmic decay in the streamwise velocity variance, and generates sub-Gaussian behaviours in its skewness and kurtosis profiles on the inertial domain. These findings along with possible refinements are also discussed.

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Juan Cuevas
University of New Hampshire

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