

Abstract Submitted
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On the transition between distributed and isolated surface roughness and its effect on the stability of channel flow JERZY M. FLORYAN, University of Western Ontario — The question of whether a system of roughness elements has to be viewed either as a distributed roughness or a set of individual, hydrodynamically independent roughness elements has been considered. The answer has been given in the context of definition of hydraulic smoothness proposed in [1] where a roughness system that cannot destabilize the flow is viewed as hydraulically inactive. Stability characteristics have been traced from the distributed to the isolated roughness limits. It has been shown that an increase of distance between roughness elements very quickly stabilizes disturbances in the form of streamwise vortices but coupling with disturbances in the form of traveling waves persists over long distances. The transition to the single roughness limit is achieved must faster in the case of roughness elements in the form of “ridges” rather than “trenches”.

[1] J.M. Floryan, Three-dimensional instabilities of laminar flow in a rough channel and the concept of hydraulically smooth wall, *Eur. J. Mech. B/Fluids*, 26 (2007) 305-329.

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