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On the nature of Karman coefficient variation in wall-bounded turbulent flow ZHEN-SU SHE, XI CHEN, YANZHI WANG, YOU WU, Peking University, China, SHE TEAM — It becomes increasingly recognized that the so-called Karman constant in wall-bounded flow is not universal, but varies from channel to pipe, and hence depends on the type of the boundary layers. Recent studies show that Karman coefficient vary with pressure gradients and unsteadiness of the smooth wall. In this study, we use an ensemble decomposition technique from a so-called structural ensemble dynamics theory, to analyze turbulent fluctuation data in a smooth channel. It is shown that a proper decomposition is able to characterize the mean property associated a set of turbulent structures. In particular, Karman coefficients obtained for bursts/streaks show systematic variations, which underlies the mechanism of variations of Karman coefficient with Reynolds numbers and with the geometry of the boundary layers.

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