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Universal Karman constant in canonical wall turbulence ZHEN-SU SHE, XI CHEN, Peking university, FAZLE HUSSAIN, Texas Tech University — A universal Karman constant $\kappa \approx 0.45$ is obtained for all three canonical wall-bounded turbulent flows (channel, pipe and turbulent boundary layer - TBL) for Reynolds numbers (Re) larger than 5,000. A New method for measuring κ from mean velocity profile (MVP) data, reported previously, is applied to 54 sets of recent experimental data (24 for smooth pipe, 8 for rough pipe, 6 for smooth channel and 16 for smooth TBL) and 3 sets of DNS data (2 for smooth channel, 1 for smooth pipe), which uniformly supports the idea that Karman constant is universal, contrary to the recent suggestions that kappa is a function of Re and geometry; its value is almost 10% larger than the classical value of 0.41, with even higher values reported at moderate Re. The validity of the log-law seems to be thus firmly established.

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