Predicting Shear Stress Distribution in Rectangular Channels Using Entropy Concept

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This study makes use of the Tsallis entropy to predict the shear stress distribution in rectangular channels. Given a definition of the Tsallis entropy, it is maximized using the probability density function, which then is used to attain a novel shear stress equation. This is then employed for calculating the shear stress distribution in rectangular channels in different aspect ratios and finally, for viability, these calculations are compared with some relevant experimental results. This derived shear stress equation is capable of describing the variation of shear stress in both the wall and the bed of channels. The comparison shows that this equation appears to be efficient for predicting the shear stress distribution in rectangular open channels. The shear force percentage and mean values of the bed and wall shear stress calculated by the proposed equation have good agreement with the experiments.

Keywords: Tsallis Entropy, Open Channel, Shear Force, Channel Wall, Channel Bed

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