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A New Approach to Achieve the Regime Equations in Sand-Bed Rivers

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Abstract : The regime or equilibrium geometry of alluvial rivers remains a topic of fundamental scientific and engineering interest. There are several approaches to analyze the problem, namely: empirical formulas, semi-theoretical methods and rational (extreme) procedures. However, none of them is widely accepted at present, due to lack of knowledge of some physical processes associated with channel formation and the simplification hypotheses imposed in order to reduce the high quantity of involved variables. The study presented in this paper shows a new approach to estimate stable width and depth of sand-bed rivers by using developed stream power equation (DSPE). At first, a new procedure based on theoretical analysis and by considering DSPE and ultimate sediment concentration were developed. Then, experimental data for regime condition in sand-bed rivers (flow depth, flow width, sediment feed rate for several cases) were gathered. Finally, the results of this research (regime equations) are compared with the field data and other regime equations. A good agreement was observed between the field data and the values resulted from developed regime equation.

Keywords : regime equations, developed stream power equation, sand-bed rivers, semi-theoretical methods
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