

## Analytical Solution of Specific Energy Equation in Exponential Channels

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**Abstract :** The specific energy equation has many applications in practical channels, such as exponential channels. In this paper, the governing equation of alternate depth ratio for exponential channels, in general, was investigated towards obtaining analytical solution for the alternate depth ratio in three exponential channel shapes, viz., rectangular, triangular, and parabolic channels. The alternate depth ratio for rectangular channels is quadratic; hence it is very simple to solve. While for parabolic and triangular channels, the alternate depth ratio is cubic and quartic equations, respectively, analytical solution for these equations may be achieved easily for a given Froud number. Different examples are solved to prove the efficiency of the proposed solution. Such analytical solution can be easily used in natural rivers and most of practical channels.

**Keywords :** alternate depth, analytical solution, specific energy, parabolic channel, rectangular channel, triangular channel, open channel flow

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