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Entropy generation minimisation in a moving porous pipe under magnetic field effect

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Abstract

The second-law aspect of an electrically conducting thermal boundary-layer flow inside a permeable pipe moving along its axis under Joule heating effect is considered here. The governing equations are normalised by suitable similarity transformations and solved analytically. An expression for average entropy number is obtained by integrating entropy number over the entire fluid volume for various cross-sections. Graphical illustrations of spatial distributions of total and average entropy of the system, the Bejan number, isotherms and heat transfer rate are imparted against different parameters of interest. The ranges of variables are reported for which entropy production is minimum. It is shown that the pipe moving with small Reynolds number needs small injection velocity to minimise entropy production in the system. Copyright © 2018 Inderscience Enterprises Ltd.

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