عنوان مقاله:

Prediction of Magnetics Entrance Length for Magnetohydrodynamics Channels Flow Using Numerical simulation and Artificial Neural Networks

محل انتشار:

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خلاصه مقاله:

A steady flow of a viscous, incompressible, laminar and electrically conducting fluid (liquid metal), in a twodimensional channel is considered. This paper focuses on a new solution based on the numerical simulation and artificial neural networks (ANNs) in order to propose a novel correlation of the magnetic entrance length for the laminarmagnetohydrodynamics (MHD) channels flow. In the first step, for different values of the Reynolds and Hartmann numbers, the numerical finite volume method (FVM) was carried out and the magnetic entrance length (Lem) was obtained. In this step, a datasets was created for a specified range of the Reynolds and Hartmann numbers. In the second step, using the datasets, ANNs were trained for the specified range of the Reynolds and Hartmann numbers and then the trained ANNs were applied to develop the datasets for a wide range of the Reynolds and Hartmann numbers. After the generation of the required datasets from ANNs, in the last step, a surface was fitted on the datasets and the correlation for prediction of the entrance length was obtained. Using this new methodology, an exquisite correlation of the magnetic entrance length for MHD channels is obtained and the effect of the different .parameters on the magnetic entrance length are evaluated

کلمات کلیدی:

Artificial Neural Networks, Channel, Magnetic Entrance Length, Magnetohydrodynamics, Numerical Simulation