

Abstract Submitted
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Deep learning for thermal plasma modelling¹ LINLIN ZHONG,
Southeast University — Numerical modelling is an essential approach to understanding the behavior of thermal plasmas in various industrial applications. We propose a deep learning method for solving the partial differential equations in thermal plasma models. In this method a deep feed-forward neural network is constructed to surrogate the solution of the model. A loss function is designed to measure the discrepancy between the neural network and the equations describing thermal plasmas. A good neural network is obtained by minimizing this loss function. We demonstrate the power of this deep learning method by solving a 1-D arc decaying model which is consist of three cases: stationary arc, transient arc without considering radial velocity, and transient arc with radial velocity respectively. The results show that the deep neural networks have excellent ability to express the differential equations describing thermal plasmas. This could bring us a new and prospective numerical tool for thermal plasma modelling.

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