An artificial neural network model of the terrestrial bow shock

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Generally the Earth's bow shock empirical shape is obtained by best-fitting to a given surface a set of observed crossings. However, the issue of bow shock modelling can be addressed by means of artificial neural networks (ANN) as well. In this regard, here it is presented a perceptron, a simple feedforward network, which computes the bow shock distance along a given direction using the two angular coordinates of that direction, the bow shock predicted distance RF79 (provided by Formisano's model (F79)) and the upstream alfvénic Mach number Ma. After a brief description of the ANN architecture and training method, we discuss the results of the statistical comparison, performed over a test set of 1140 IMP8 crossings, between the prediction accuracies of ANN and F79 models.