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1 Long-term prediction of solar activity using spectral analysis and multi input multi output neuro-fuzzy models

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In this paper, a method based on spectral analysis and multi input multi output (MIMO) neuro-fuzzy modeling is proposed that is capable of issuing very accurate long term prediction of solar activity. A MIMO locally linear neuro-fuzzy model is optimized for each of the principal components obtained from singular spectrum analysis, and the multi step predicted values are recombined to make the solar activity time series as natural chaotic phenomena. The method has been applied to the long-term prediction of some solar activity indexes e.g. sunspot number time series, disturbance storm time (DST) and solar wind plasma. Results depict the power of the proposed MIMO neuro-fuzzy models in long-term prediction of solar activity in compare to the other methods.