

PREDICTION OF THE SUNSPOT ACTIVITY USING THE SHADOWING FILTER.

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We study how the shadowing filter applies for a low dimensional dynamical model of the solar cycle by Platt, Spiegel, and Tresser (PST model), and available observations of the sunspots number to generate forecast of future solar activity. This model sees variations of the solar activity as a result of the coupling of the nonlinear oscillation and a chaotic oscillator. Each of these oscillations are interpreted as the motion in the convection zone and the tachocline dynamo.

This case study constitutes a perfect example for assessing the predictability of the variations of the sunspot number, where the model available (e.g. the PST model) is an imperfect model of the complex dynamics of the sun, and at the same time is a tractable mathematical representation of the physics that features the same intermittency shown in the sunspot number observational data.

The solar activity prediction problem is in many ways similar to the problem of verification and prediction of climate. In both cases, it is important to better constrain predictions to observations and to measure the quality and reliability of predictions, either to inform the physics of the model or decision making.