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A model for spin wave envelopes in thin film active feedback rings[1] JUSTIN ANDERSON, LINCOLN CARR, Colorado School of Mines, MINGZHONG WU, Colorado State University — Experimental observation of spin wave envelopes in magnetic thin films occurs in non-conservative systems. The generation of time-stable results is realized by approximating a conservative system through active feedback or otherwise driving the system into equilibrium with its major loss mechanisms. A variety of nonlinear dynamics have been observed in systems of this form, including chaos, soliton formation, and the chaotic modulation of solitary wave train envelopes. The envelope dynamics of these dissipative systems are typically modeled by a nonlinear Schrödinger equation (NLS). The NLS is an integrable model which may not yield chaos. The severity of the local nonlinear term will also exhibit time dependence in any dissipative system due to the presence of loss and gain. A driven, damped model is proposed and studied numerically in the context of solitary wave trains. The model is a generalized NLS including a higher order in nonlinearity and gain/loss mechanisms at linear, cubic, and quintic orders. Investigation of the gain loss NLS is reported and an agreement of simulations with experimental observation is demonstrated.

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