Detecting recursive and non recursive filters using chaos

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Filtering a chaotic signal through a recursive (or IIR) filter has been shown to increase the dimension of the chaos under certain conditions. Filtering with a non recursive (or FIR) filter should not increase dimension, but it has been shown that if the FIR filter has a long tail, measurements of actual signals may appear to show a dimension increase. I simulate IIR and FIR filters that correspond to naturally occurring resonant objects, and I show that using dimension measurements, I can distinguish the filter type. These measurements could be used to detect resonances using radar, sonar or radar signals, or to determine if a resonance is due to an IIR or an FIR filter. I am also able to detect a very broad resonance with a narrow bandwidth signal.