

Abstract Submitted
for the OSF09 Meeting of
The American Physical Society

A Matched Filter for Chaos MARK STAHL, JONATHAN BLAKELY, NED CORROR, US Army RDECOM — In conventional communication theory, a matched filter provides optimal reception of information through additive Gaussian white noise. Chaos communication schemes have always performed worse than conventional schemes in the presence of noise due to the lack of a matched filter. We present a novel chaotic oscillator for which a matched filter exists. This oscillator differs from other known chaotic systems in that its waveform can be written as a linear superposition of a single basis function with random polarity at integer time steps. The matched filter is a linear filter with the time reversed basis function as its impulse response. We show experimental circuit implementations of both the oscillator and the matched filter. The matched filter output is shown to directly reveal the information content of the chaotic waveform.

Elizabeth George
Wittenberg University

Date submitted: 17 Sep 2009

Electronic form version 1.4