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Vadim Zharnitsky* (vzh@illinois.edu), Department of Mathematics, University of Illinois, Urbana, IL 61801, and **Yuliy M. Baryshnikov**, Bell Labs, Alcatel-Lucent. *Nonlinear dynamics in the linear search problem.*

Consider an object that is hidden on the real line with a fixed (say Gaussian) probability distribution. To find the object one has to search to the right, then to the left, and then again to the right and so forth until the object is found. What is the best way to conduct this search? How to minimize the time of the search? This (and other natural variations) is one of the basic search problems in the field of operations research. The search problems have already received considerable attention in the engineering literature and many important results have been obtained. We attempt to introduce new tools based on the classical objects from nonlinear dynamics such as invariant manifolds to give qualitative explanation of specific optimal search strategies. This is a preliminary report with conclusions relying on numerical simulations and heuristic arguments. (Received March 30, 2010)