1096-39-1212 **Winfried Just** and **German A. Enciso***, 440E Rowland Hall, University of California, Irvine, Irvine, CA 92697. *Ordered Dynamics in Biased and Cooperative Boolean Networks.*

This paper contributes to the theoretical analysis of the qualitative behavior of two types of Boolean networks: biased and cooperative ones. A Boolean network is biased if at least a specified fraction of its regulatory functions returns one Boolean value more often than the other and is cooperative if there are no negative interactions between the variables. We prove nontrivial upper bounds on the maximum length of periodic orbits in such networks under the assumption that the maximum number of inputs and outputs per node is a fixed constant r. For the case of n-dimensional networks with $r = 2$ in which only AND and OR are allowed, we find an upper bound of $10^{n/4}$, which is asymptotically optimal in view of previously published counterexamples. The theoretical results are supplemented by simulations of the generic behavior of cooperative networks which indicate that for large in-degrees, trajectories tend to converge rapidly towards a steady state or small periodic orbit. The latter starkly contrasts with the behavior of random arbitrary Boolean networks. (Received September 13, 2013)