1044-37-108 **James A. Yorke*** (Yorke@umd.edu), College Park, MD 20742. *Period-doubling cascades in systems having generic bifurcations.*

The presence of an period-doubling cascade in dynamical systems that depend on one parameter is a hallmark of the onset of highly complex dynamics. However, their existence has only been explained in a quite restrictive set of examples. Based on earlier work with Alligood and previous work by John Franks, we have developed a theory which gives rise to large new classes of one-dimensional families with period-doubling cascades. Furthermore we explain why these systems have infinitely many cascades, each with an infinite number of period-doubling bifurcations. We restrict attention to "typical" systems, those that have only generic bifurcations. The results generalize to give results in dimension greater than one, giving rise to new classes of examples for higher-dimensional systems. Period-doubling cascades consist of bifurcations which occur at closer and closer spacing, and are not always attracting. Thus they are very difficult to find using purely computational techniques. In general, using purely geometric methods we can verify the existence of period-doubling cascades by looking at the set of periodic orbits at just two parameter values.

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