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Barry A. Peratt* (bperatt@winona.edu), Department of Mathematics & Statistics, Winona State University, 175 West Mark Street, Winona, MN 55987, and **Judy A. Kennedy** (kennedy9905@gmail.com), Department of Mathematics, Lamar University, 4400 MLK Blvd., P.O. Box 10009, Beaumont, TX 77710. *The Topology of Tank Stirring.*

We examine the topology of stirring in a cylindrical tank with a centrally located impeller and a recycle loop. In contrast to the usual approaches involving partial differential equations or statistical mechanics, we consider an idealized mathematical model which consists of a geometrically motivated discrete time process. Our numerical studies indicate the existence of invariant tori, corresponding to periodic orbits, within which no mixing occurs. In addition to rigorously proving the existence of such tori, we prove that, under certain mild conditions, the topological structure which evolves is a “Sierpinski-like” curve $\times S^1$. (Received February 13, 2010)