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Topological Classification of Periodic Solutions to the Point Vortex Model SPENCER SMITH, Mount Holyoke College — The point vortex model represents one of the earliest attempts to discretize the field equations of fluid motion. Since the time of Helmholz, it has served as a starting point for the investigation of such disparate phenomena as weak turbulence and negative temperature states. Using this simple and elegant model, we created a large data set of numerically generated periodic orbits for small numbers of identical vortices. We then applied a topological classification scheme based on braid theory to organize and sort the data. This novel approach reveals unexpected and intriguing patterns in the distribution of these solutions in phase and parameter space.

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