1115-34-287 **John Jinho Kim*** (jkim40@ncsu.edu). *Numerical computation of heteroclinic orbits based on the Principle of Wazewski.* Preliminary report.

The principle of Wazewski states that if there is a bounding region for the differential equation $\dot{x} = f(x)$ that satisfies certain hypotheses, then there exists a solution inside the region all the time. This has been a major tool to show the existence of traveling waves in many areas of mathematics such as predator-prey models, chemical reactions, and thermodynamics.

The purpose of this research is twofold. The first part is to develop a shooting method based on the principle of Wazewski to numerically compute the heteroclinic solution of the dynamical system, and determine the speed of convergence in terms of eigenvalues and the angles of intersection between stable and unstable manifolds of the equilibria.

The second part is to prove an inverse of the principle of Wazewski for some specific cases. Given the differential equation $\dot{x} = f(x)$ in $\mathbb{R}^3$, if there is a heteroclinic orbit formed by the intersection between the unstable manifold of E^- and the stable manifold of E^+, then the trapping region containing such an orbit can be constructed.

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