

Abstract Submitted
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Is the Knuckleball Pitch Chaotic? ERIC STRAUSS, NICHOLAS NELSON, California State University, Chico — The knuckleball is the least understood pitch in baseball. Very little rotation combined with asymmetric airflow over the ball created by the raised seams makes the trajectory highly unpredictable. By tracking large numbers of knuckleballs, it has been shown they can move in any direction. This has led to the conjecture that knuckleballs demonstrate chaotic motion. Here we show that a simple model, which includes quadratic drag and an empirical parameterization of lift caused by asymmetric airflow from the seams, does in fact exhibit dynamical chaos so long as torques on the ball due to the asymmetric flow are included. We show that changing our initial angle and spin by one part in a million can cause substantial changes in the trajectory of the pitch. Pitches with this infinitesimal change in initial conditions are shown to vary in location at the plate by as much as 30 cm.

Eric Strauss
California State University, Chico

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