1099-37-249   **William Yessen*** (`yessen@rice.edu`). *The Newhouse Phenomenon in the Fibonacci Trace Map.* The Fibonacci trace map (FTM) is a conservative polynomial map of degree two acting diffeomorphically on the three-dimensional Euclidean (real or complex) space. This map is related to a number of problems in physics, geometry, algebra and dynamical systems. It turns out that the FTM preserves a family of algebraic surfaces, which are the level surfaces of a polynomial function, called the Fricke-Vogt invariant. For some values of the Fricke-Vogt invariant, the corresponding surfaces have a compact component in the form of a topological sphere, also preserved by the FTM. We show that the FTM, when restricted to the compact components of the Fricke-Vogt invariant, is a conservative map exhibiting the Newhouse phenomenon. We discuss the implications of our findings. In particular, the FTM mirrors all the essential properties of the well known Taylor-Chirikov standard map and provides an example of a simple conservative map with nontrivial dynamics. We shall also present a number of open problems.

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