1135-37-358 **Joshua P. Bowman*** (joshua.bowman@pepperdine.edu), Natural Science Division, Pepperdine University, 24255 Pacific Coast Highway, Malibu, CA 90263, and **Slade Sanderson** (slade.sanderson@pepperdine.edu). *Angels' staircases and trajectories on homothety surfaces.*

A homothety surface is an orientable surface equipped with an atlas whose transition maps are homotheties – that is, compositions of translations and scaling. A discrete set of cone-type singularities is allowed. Homothety surfaces enjoy many of the same properties as translation surfaces have, including a well-defined notion of direction (slope) everywhere except at the singularities and an action by $GL(2,\mathbb{R})$. They have so far appeared only sporadically in the literature, and many basic questions about their dynamical properties remain open.

In this work, we study a certain one-parameter family of genus 2 homothety surfaces. We show that they all have essentially the same behavior for their linear trajectories, which have a surprisingly simple relation to trajectories on the square torus. There is a dense open set of directions in which the surface has a periodic trajectory. In an uncountable set of directions, the closure of a critical trajectory has a Cantor set cross-section. We give explicit formulas for these directions and show that all the Cantor sets involved have Hausdorff dimension zero.

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