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The "Escape Set" elucidates chaos in the restricted three-body problem EVAN HEIDTMANN, JOHN F. LINDNER, Physics Department, The College of Wooster, Wooster OH 44691 — We analyze solar escape as a special case of the restricted three-body problem. By numerically integrating the trajectories of millions of particles shot from Earth with different initial conditions, we determine their displacements after a fixed time. On a polar plot of (pseudo) energy radially and initial direction angularly, we color code these distances. The resulting "Escape Set" elucidates chaos in the three-body problem in the same way that the Mandelbrot set illustrates complexity in nonlinear maps: at low energies, the projectile is trapped; at high energies, it easily escapes; at intermediate energies, it executes intricate chaotic orbits with unbounded excursions and repeated returns. We acknowledge support from NSF-REU grant DMR 0243811.

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