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Lennard F. Bakker* (bakker@math.byu.edu), 366 TMCB, Provo, UT 84602, and **Skyler C. Simmons** (xinkaisen@gmail.com). *The Rhomboidal Symmetric-Mass Four-Body Problem.*

We consider the existence and stability of periodic solutions with regularizable collisions in the rhomboidal symmetric-mass four-body problem. In the two degrees of freedom setting, where the analytic existence of the periodic solutions is given by a variational method, we show that the periodic solutions are numerically linearly stable for most of the values of the mass parameter. In the four degrees of freedom setting, we establish the analytic existence of the periodic solutions and numerically investigate their linear stability. (Received September 20, 2012)