1070-70-321 **Gareth E. Roberts*** (groberts@radius.holycross.edu) and **Josep M. Cors**. *Cyclic Central Configurations in the Four-Body Problem.*

We classify the set of central configurations lying on a common circle in the Newtonian four-body problem. Such a configuration will be referred to as a cyclic central configuration. Using mutual distances as coordinates, we show that the set of cyclic central configurations with positive masses is a two-dimensional surface, a graph over two of the exterior side-lengths. Two symmetric families, the kite and isosceles trapezoid, are investigated extensively. We prove a specific ordering of the masses is required and find explicit bounds on the mutual distances. In contrast to the general four-body case, we show that if any two masses of a cyclic central configuration are equal, then the configuration has a line of symmetry. In addition to utilizing many analytic arguments, our techniques also invoke classical geometry (e.g., the Cayley-Menger determinant and Ptolemy's Theorem) as well as modern computational algebra (e.g., Groebner bases and Sturm's Theorem.) (Received February 15, 2011)