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Canada. *Relative equilibria in the 4- and 5-body problem*. Preliminary report.

We explore the equation of motion in curved and flat space. We first derive the bifurcation of the integrals of motion when the curvature parameter passes through zero. Then we provide a method to find the relative equilibria in the curved 4-and 5-body problem. We seek the relative equilibria on the equator for 4-body problem. In particular, we study the case of two negligible masses and two equal masses. As a result, we prove that square relative equilibria always exist on the 2-sphere of constant Gaussian curvature. Also, we consider the case of three equal masses and one negligible mass, and will put into the evidence some kite-shaped solutions. Finally, we prove the existence of relative equilibria on the equator in the 5-body problem. (Received September 17, 2017)