The Newtonian $n$-body problem studies the motion of $n$ point masses moving in the Euclidean space, under the influence of their mutual gravitational attraction. The motion is determined by the system of differential equations:

$$\ddot{x}_i = \sum_{j \neq i}^n \frac{m_j}{|x_j - x_i|^3}(x_j - x_i), \quad x_i \in \mathbb{R}^3,$$

where $x_i$ and $m_i$ represent the position and the mass of the $i$-th mass respectively.

We consider three sub-problems of the $N$-body problem that have two degrees of freedom, namely the $n-$pyramidal problem, the planar double-polygon problem, and the spatial double-polygon problem. We prove the existence of several families of symmetric periodic orbits, including “Schubart-like” orbits and brake orbits, by using topological shooting arguments. (Received May 21, 2014)