

# Only Lagrange is syzygy-free

Richard Montgomery<sup>1</sup>

<sup>1</sup> University of California Santa Cruz (USA)

## **Abstract**

We consider the zero angular momentum Newtonian three-body problem with any (positive) mass ratios and negative energy. A syzygy is a collinear configuration. We prove that with the exception of Lagrange's equilateral triangle solution every solution suffers syzygies. The method and results continue those of a previous paper. The result sets the stage for a symbolic dynamical description whose symbols are the three types of syzygies.