

## 9.1: Divine Guidance

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Incredibly, Maupertuis came up with a kind of principle of least action in 1747, long before the work of Lagrange and Hamilton. Maupertuis thought a body moved along a path such that the sum of products of mass, speed and displacement taken over time was minimized, and he saw that as the hand of God at work. This didn't go over well with his skeptical fellow countrymen, such as Voltaire, and in fact his formulation wasn't quite right, but history has given him partial credit, his name on a least action principle.

Suppose we are considering the motion of a particle moving around in a plane from some initial point and time *[Math Processing Error]*. Suppose its potential energy is a function of position, *[Math Processing Error]*. For example, imagine aiming for the hole on a rather bumpy putting green, but also *requiring that the ball take a definite time*, say two seconds, from being hit to falling in the hole. The action principle we've talked about so far will give the path, parameterized by time, *[Math Processing Error]*.

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