

## Shove Ha’Penny

Shove ha’penny is a traditional pub game<sup>1</sup>, informal variants of which are often used to determine who will pay for drinks. As with so many other pub games this one will be won by the players with the best understanding of the mathematics of friction and collisions. (Interestingly roulette is another such game<sup>2</sup> and for this reason it is illegal to take a computer capable of solving the roulette equations into a casino.)

- What is the coefficient of friction between a moving coin and a board? This can be found by videoing a moving coin, extracting its trajectory and comparing with the equation. Or by tilting the table until a moving coin just carries on and measuring the angle. Is this different for different denomination coins?
- What is the equation describing the trajectory of a moving coin?
- How fast should you shove a coin to win the game?

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<sup>1</sup>For rules see <http://www.mastersgames.com>.

<sup>2</sup>T. A. Bass. *The Newtonian Casino*. Penguin (1991).