

Optimizing a Volleyball Serve

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An optimal volleyball serve is one that gives the receiving team minimal time to react. That is, it is one in which the ball goes over the net and hits the floor in the shortest amount of time. This paper models the flight of a served volleyball acted upon by gravity, air resistance, and the effects of spin. Coefficients of drag and spin were determined via crude but ingeniously effective experiments, and the trajectories of theoretical models were compared with actual trajectories of volleyballs shot from a launcher. Finally, we use the model to find the optimal serves while varying the height of the serve, the amount of spin, and the total distance traveled.