

Reading the Bounce: Modeling a Football's Bounce

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Abstract

The purpose of this study was to model how a football would bounce in various scenarios using equations. The effects of factors such as angle of contact with the ground and spiral on a football's bounce were examined through video analysis. Logger Pro was used so that each bounce's trajectory could be tracked and compared so that the extent of each variable's effects on bounces could be evaluated and represented by equations. It was found that angles of contact with the ground which are closer to completely horizontal or vertical result in the least change in horizontal velocity but the most the vertical velocity, whereas angles of contact which are closer to forty-five degrees results in the most change in horizontal velocity but the least in vertical velocity. Spiral on a horizontal ball has a linear relationship with the ball's change in horizontal velocity after bouncing, but the extent of this effect is reduced if the spiraling ball hits the ground at an angle or vertically.