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**A Study on the Soccer Ball Mechanics and Dynamics Using Physical and Computational Simulations** JOON YOUNG PARK , RICHARD KYUNG, Choice Research Group — Soccer ball mechanics and dynamics involve aerodynamics, the study of forces and the resulting motion of objects as they fly through the air. The way a soccer ball curves through the air is determined by the values of factors such as speed of the kick, direction, angle, and even weather conditions. Some of the factors contributing to weather conditions include pressure, temperature, humidity, and altitude of the environment in which the soccer ball is being kicked. Other elements such as distance, vertical angle, horizontal angle are to be calculated when analyzing the aerodynamics of a soccer ball. In this paper, we studied and analyzed for the equations involving various factors that can be applied to soccer ball mechanics through a specially designed computer application, deciphering possible bending and spinning of the soccer ball. In this research, with mechanics and a program, we studied how a soccer player bends the ball, creating the Magnus effect by changing the values of the factors that affect the lift and drag aerodynamic forces on the ball. Also, we considered whether the condition is a laminar flow or turbulent flow which can be identified by the Reynolds number.

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