Galileo's Ladder Problem: Rope Ladders Falling Faster than Gravity

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Have you ever wondered if there are things that fall faster than gravity? We definitely want to reply with a "yes" to this question and we are providing the answer with our project. If you drop a rope ladder with inclined rungs so that it collides with a table, it experiences an acceleration greater than that of a free-falling ladder. We asked ourselves the following questions: What is the reason for this phenomenon? What does the speed depend on? How can it be calculated? We developed a theory to calculate the speed of a colliding ladder iteratively, because until now, only rough estimates of the velocity existed in literature. With a high-speed camera, we filmed the falling process and obtained the velocities and accelerations through video tracking. We actually observed accelerations greater than g and we were able to verify our theory very well using the experimental data. In summary, it can be said that we succeeded in developing a theory for the iterative calculation of a ladder's speed and confirming it by experiments.

Awards Won:
Second Award of $2,000