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A simple pendulum study using a smartphone video camera

In general, a simple harmonic motion is studied by measuring and recording the time required for the bob to complete a cycle. In addition, many experiments use smartphone or motion sensor to measure the motion. This method requires the installation of additional equipment into the system, and thus the moment of inertia of the system involves in those devices. In this study, we present the new method for measuring the angular frequency and maximum angular position. In the method, the motion of a simple pendulum is recorded by a smartphone video camera. The video is analyzed by the software (Tracker). From the video, the relationship between angular position and time is represented the sinusoidal pattern. Therefore, the maximum angular position and angular frequency are received by fitting the sinusoidal pattern. Furthermore, the frequency, period, and acceleration due to the gravity are calculated from the angular frequency. The result shows that the new method is as good as the general methods. Furthermore, the new method can also be applied to the complicated systems as well.

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