Experimental measurement of a damped oscillator

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(Dated: August 29, 2026)

This report starter demonstrates the compact structure of a Physics 200 laboratory report: motivation, method, measured data, analysis, and a concise conclusion. Replace every example value with observations from your experiment.

I. INTRODUCTION

We measured the oscillation period of a mass–spring system and used the result to estimate its effective spring constant. A useful model is

$$x(t) = A\,e^{-\gamma t}\cos(\omega t + \phi). \tag{1}$$

II. METHOD

The mass was displaced by approximately 3 cm, released without an impulse, and recorded for ten cycles. The equilibrium position was checked before each trial.

III. RESULTS

The mean period from Table I is $T = 1.42\,\mathrm{s}$. For a known mass m, the fitted spring constant is $k = 4\pi^2 m/T^2$. State uncertainty estimates and the fit procedure here.

IV. DISCUSSION

The measured period was stable over the observed interval, while the gradual decrease in amplitude indicates weak damping. Discuss systematic effects, repeatability, and whether the model assumptions are justified.

V. CONCLUSION

Summarize the result with units and uncertainty, then state the main physical lesson of the experiment.

TABLE I: Representative measurements.

Trial	Period (s)	Amplitude (cm)
1	1.42	2.9
2	1.40	2.8
3	1.43	2.7