SCHOLARLY PRESS LAB / DEMONSTRATION 001

Working Knowledge

A small reader with an executable companion

Sources remain sources. Editorial additions remain additions. The companion makes a model inspectable.

EDITION 01 · ed-c8e5354b7b2f85d29ca3

LOCAL PROOF • Original synthetic fixtures, not a collection of real academic papers. Generated for an implementation handoff. Not approved for commercial print production.

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About this proof

All three source notes are original synthetic fixtures. They exercise source preservation, an explanatory simulation, and the boundary between an intellectual edition and a print job. They are not evidence of successful reconstruction of arbitrary academic PDFs.

Source locators and new book-page numbers are recorded separately in source-map.json. The companion is self-contained HTML and works without an account or external service.

01 / SOURCE NOTE

An equation and its moving world

Scholarly Press Lab demonstration / version 1

A printed equation fixes a relationship. A companion can make that relationship inspectable without replacing the equation or the surrounding argument. This note uses a damped oscillator as a small, deliberately transparent example. It is original demonstration material, not a reconstruction of a historical paper.

$$x''(t) + 2\zeta\omega\, x'(t) + \omega^2\, x(t) = 0$$

Here x is displacement, t is time, ω is the natural angular frequency, and ζ is the damping ratio. The companion assumes ω is positive and ζ is nonnegative. Its default initial conditions are $x(0) = 1$ and $x'(0) = 0$. These conventions are part of the model, not settings to hide in implementation code.

Three regimes of the same model

Damping ratio	Qualitative regime
$0 \le \zeta < 1$	Underdamped: decaying oscillation
$\zeta = 1$	Critical damping
$\zeta > 1$	Overdamped: no sustained oscillation

The model is linear and time invariant. There is no external forcing, no dry friction, no changing spring constant, and no stochastic disturbance. A smooth moving trace does not supply evidence that a real object obeys these assumptions. The reader is exploring consequences of an idealization.

$$E(t) = \tfrac{1}{2}[x'(t)^2 + \omega^2 x(t)^2];\ E'(t) = -2\zeta\omega x'(t)^2$$

Multiplying the equation of motion by the velocity gives the energy relation. With zero damping the ideal energy is constant. With positive damping it cannot increase. This provides a check that is independent of whether the plotted curve looks plausible.

The companion is labeled an interpretation: a new explanatory implementation of this fixture. It does not claim to reproduce an experiment, a measured dataset, or the original authors’ software.

EDITORIAL ADDITION

The interactive companion makes the assumptions and numerical checks inspectable. Its code and tests travel with this edition; it is not an empirical validation of the model.

Evidence: oscillator-note:assumptions, numerics-note:checks

02 / SOURCE NOTE

What makes a simulation trustworthy?

Scholarly Press Lab demonstration / version 1

A simulation deserves more than a screenshot test. Rendering a curve successfully says little about whether the underlying calculation is correct. This companion exposes both a numerical trajectory and a closed-form solution so that disagreement can be measured rather than hidden.

$$x' = v;\ v' = -2\zeta\omega v - \omega^2 x$$

The numerical implementation uses the classical fourth-order Runge–Kutta method with a fixed time step. The analytic implementation uses separate formulas for underdamped, critically damped, and overdamped motion. These two routes share the same declared equation and initial conditions, but not the same stepping algorithm.

Verification obligations

Check	What it can detect
Initial conditions	Wrong integration constants
Analytic comparison	Numerical implementation errors
Step refinement	Incorrect convergence behavior
Energy behavior	Sign errors or unstable stepping
Input limits	Invalid or excessive computations

Agreement between two implementations is not a proof of the physical assumptions. A shared modeling mistake can survive both. Numerical tests support a narrower claim: for the stated idealized equation, selected parameter values, and a tested range of time steps, the implementation behaves as expected.

The printed edition should state what the companion assumes, what the tests establish, and what they do not establish. A reader who never opens a browser must still be able to understand the argument. Interaction is an additional mode of inquiry, not a substitute for an intelligible book.

A printed edition cannot update when a bug is fixed online. Its companion therefore needs an immutable edition identifier, a preserved implementation, and a visible errata path. A newer model may be useful, but it must not silently become the historical companion of an already printed edition.

03 / SOURCE NOTE

From a collection to an edition

Scholarly Press Lab demonstration / version 1

An anthology is an editorial construction, not just a directory of files. Selection, sequence, introductions, indexes, and cross-references can make a collection legible. These additions must remain distinguishable from the source works they organize.

A catalog entry can identify an instrument, a method, a text, or a working demonstration. It should say what the item is for, which claims support it, what prerequisites it has, and what a reader can actually do with it. This structure can support a dense magazine or a reference catalog without forcing every contribution into the shape of a conventional chapter.

Preserve the source’s internal numbering, author attribution, and bibliographic boundaries. An anthology page number is not an original page number. When a source is an excerpt, disclose the selection. When a re-typeset version cannot be verified, retain a clearly marked facsimile or stop for review rather than inventing missing material.

The editorial layer may explain connections, introduce a simulation, or identify open questions. It should not silently insert new claims into a source paragraph. A model that writes elegant introductions is not thereby an authority on whether a quotation, number, or equation is correct.

Separate the intellectual edition from its manufacturing instructions. A paperback, a large-format magazine, and a sewn catalog may share source material but need different typography, page counts, covers, and printer-specific files. The common object is an edition manifest, not a supposedly universal PDF.

This proof is intentionally small. Its purpose is to make the preservation boundary, the companion contract, and the release gates executable. It is not evidence that arbitrary academic PDFs can already pass through the system without intervention.

Companion & edition record

Open companion.html alongside this proof. Move the damping and frequency controls, compare the analytic and numerical trajectories, and export the selected data. This demo is an interpretation, not a historical reproduction.

Assumptions

Linear time-invariant oscillator; no external forcing.

Natural angular frequency is positive; damping ratio is nonnegative.

Default initial displacement is 1 and initial velocity is 0.

Limitations

No experimental data are reproduced.

This implements a synthetic fixture, not a historical paper.

Passing numerical tests does not validate the physical assumptions.

Production status

This is a readable local proof. No vendor profile, production cover, PDF/X claim, paid print order, public website, or academic peer review is implied. A physical proof and provider-specific preflight are separate release gates.

Reproducibility

The lock file records source hashes, template and code hashes, and the edition identity. The build report records dependency versions. Byte-level reproduction is promised only in a matching environment; the source inventory and provenance remain independently inspectable.