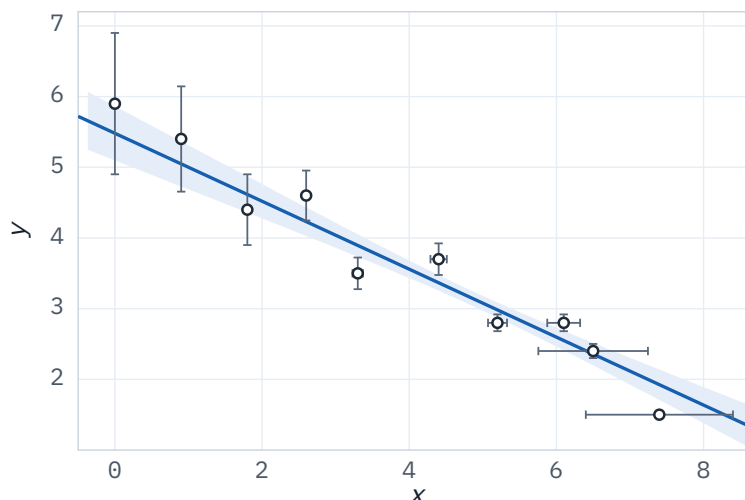


Fit lab data with uncertainties in x and y. Hand in a clean PDF.

curve.fit is a free web tool for fitting models to experimental data. Students paste their measurements, choose a model, and get fitted parameters with 1σ uncertainties, residuals and a report ready for the lab notebook. It runs in any browser, with nothing to install and no accounts.

Open curve.fit

Try the Pearson-York example



$$m = -0.4805 \pm 0.0706 \quad b = 5.480 \pm 0.359$$

$$\chi^2_{\text{red}} = 1.48$$

Pearson's data with York's weights (Pearson 1901; York 1966), fitted on curve.fit with uncertainties in both coordinates. The shaded band is the 68% model uncertainty. Published result: $m = -0.48053$, $b = 5.4799$ (Cantrell 2008).

1,000,000+

fits run since 2019

30

built-in models, plus
custom equations

55

NIST reference fits
checked before every
release

\$0

free to use, no install,
no accounts

Both error bars count

Spreadsheet trendlines ignore measurement uncertainty. curve.fit uses orthogonal distance regression (ODRPACK95, through the odrpack package) when students supply δx and δy , so every point is weighted by its uncertainty in both directions. With δy only it runs weighted least squares; with neither, ordinary least squares.

- Uncertainties come from a table column per point, or from one constant or percentage for the whole dataset.
- Students choose how parameter uncertainties are reported. **Absolute** uses the supplied 1σ values as given. **Nominal**, the default, rescales by $\sqrt{\chi^2_{\text{red}}}$, the same default as SciPy, lmfit and Origin.
- Every fit shows a model uncertainty band and a residual plot.
- The Model Evaluator predicts $y \pm \delta y$ at any x , propagating parameter uncertainty and an optional δx .

UNCERTAINTIES SUPPLIED	FITTING METHOD	CHECKED AGAINST
None	Ordinary least squares in y	NIST reference datasets and a closed-form linear regression
δy only	Weighted least squares in y	An independent weighted linear regression, including parameter uncertainties
δx only	Orthogonal distance regression, exact-y limit	An independent regression of x on y, transformed back
δx and δy	Weighted orthogonal distance regression	The Pearson–York benchmark and an independent implementation of York’s equations

Checked against published reference results

Before every release, an automated suite fits reference datasets with known answers and compares parameters, standard errors and residual sums of squares. The details, tolerances and references are published in the [Help](#).

NIST Statistical Reference Datasets

21 datasets, 4 linear and 17 nonlinear, fitted from 55 certified and published starting points. Parameters, standard errors and residual sums of squares must match NIST's certified values.

relative tolerance 1×10^{-6}

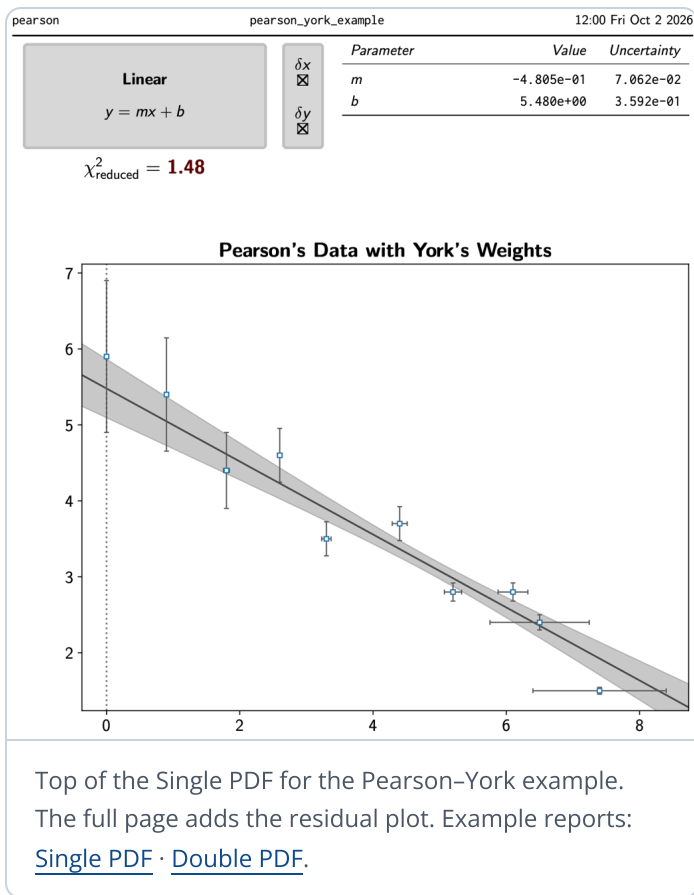
Pearson–York benchmark

The classic test for fitting with errors in both variables: Pearson's data with York's weights, compared with the published results in Cantrell (2008). Load it in one click to show a class.

m = -0.48053 b = 5.4799

REFERENCES

1. Pearson, K. (1901). On lines and planes of closest fit to systems of points in space. *Philosophical Magazine*, 2, 559–572.
2. York, D. (1966). Least-squares fitting of a straight line. *Canadian Journal of Physics*, 44, 1079–1086.
3. Cantrell, C. A. (2008). Technical Note: Review of methods for linear least-squares fitting of data and application to atmospheric chemistry problems. *Atmospheric Chemistry and Physics*, 8, 5477–5487. [doi:10.5194/acp-8-5477-2008](https://doi.org/10.5194/acp-8-5477-2008)
4. NIST Statistical Reference Datasets, nonlinear and linear regression. nist.gov/itl/sed



LAB-READY OUTPUT

A one-page report for every fit

Every fit exports a PDF with the model and equation, fitted parameters and uncertainties, reduced χ^2 , the plot with error bars and uncertainty band, and the residuals.

- **Single PDF** for one report. **Double PDF** prints two copies side by side for lab partners.
- Titles and axis labels accept LaTeX math, typeset with TeX.
- **Browser Report** opens the fit with full-precision tables and model samples, with CSV and JSON downloads for further analysis.
- Each report is stamped with its session, fit ID and time, so an instructor can open the fit behind a submitted report.

Productive in minutes

curve.fit

Curve Fitting with X and Y Uncertainties

SETUP

FIT 1 Oct 2 19:01:21

PREVIOUS

FEEDBACK

TEMPLATE

HELP

WALKTHROUGH

x	δx	y	δy
0	0.031622777	5.9	1
0.9	0.031622777	5.4	0.745355992
1.8	0.04472136	4.4	0.5
2.6	0.035355339	4.6	0.353553391
3.3	0.070710678	3.5	0.223606798
4.4	0.111803399	3.7	0.223606798
5.2	0.129099445	2.8	0.119522861
6.1	0.223606798	2.8	0.119522861
6.5	0.745355992	2.4	0.1
7.4	1	1.5	0.04472136

MODEL

Linear

$y = mx + b$

UNCERTAINTIES

①

Absolute

Nominal

δx

None

Table

Expression

δy

None

Table

Expression

PLOT LABELS & AXES

Title

Pearson's Data with York's Weights

x

lin

log

y

lin

log

PARAMETERS

Name	Guess	Fix	Fitted	δ (1σ)
m	auto	☐	-4.805e-01	7.062e-02
b	auto	☐	5.480e+00	3.592e-01

MODEL EVALUATOR

CALCULATE

x

δx

y

δy

RESULTS

Converged

1.48

reduced χ^2

EXPORT

SINGLE

PDF

DOUBLE

PDF

BROWSER

REPORT

The workspace after fitting the Pearson–York example. Setup and each saved fit have their own tab.

- 1

Paste the data

Copy x, δx, y and δy straight from a spreadsheet, or import a CSV file of up to 10,000 rows.
- 2

Choose a model

Pick one of 30 models or type an equation. Starting values are automatic.
- 3

Fit

Read the parameters, reduced χ^2 and residuals. Each fit opens in its own tab.
- 4

Predict

Use the Model Evaluator to get $y \pm \delta y$ at any x.
- 5

Export

Download the PDF for the lab report, or the data as CSV.
- A guided walkthrough fits a sample dataset in about five minutes, in a separate practice tab.

Custom equations use x and up to five parameters, A to E, with common functions and π . The equation is checked as students type, and a matching built-in model is suggested when there is one.

Every fit is saved to a session link. Students can return later, compare earlier fits, or fork a copy to try something new.

Models for physics, chemistry and biology labs

Arrhenius
Cauchy
Cubic
Damped Oscillator
Double Exponential

Exponential Decay (Half-life)
Exponential with Offset
Gaussian

Gaussian on Linear Background
Hill Sigmoid (4 Parameter)
Inverse
Linear
Logistic

Logistic (5 Parameter)
Lorentzian
Malus's Law
Natural Log
Oscillator
Poisson

Power Law
Power Law with Offsets
Power Law with Vertical Offset
Quadratic
Quartic

Saturation (Michaelis-Menten)
Shifted Reciprocal
Stokes Law
Two Slit Interference

Weighted Mean
X Log X
Custom equation (A-E)

FOR INSTRUCTORS

Easy to adopt across sections

One method for every section

Every student uses the same fitting method and reporting conventions, whatever computer they have.

Share a dataset as a link

Fit an example once and share its session link. Reference examples such as Pearson–York and several NIST datasets load in one click.

Documented methods

The Help explains the fitting modes, uncertainty conventions, model bands and validation, with references students can cite.

Reproducible in Python

A short SciPy template performs the same kind of ODR fit, for courses that want students to see the code.

Nothing to administer

No installs, licenses or student accounts. It runs in any modern browser on lab computers and laptops.

Free to use

There is no cost to students or departments.

TRY IT IN YOUR NEXT LAB

Open a real example and fit it in under a minute

[curve.fit](#)

Start with your own data

[curve.fit/pearson](#)

The Pearson–York benchmark, ready to fit

[curve.fit/help](#)

Methods, conventions and validation

Usage figures are from curve.fit's own records, October 2019 to September 2026.