$V^2 \Delta P$ ← change from P diff

$P V^{2-1} \Delta V$ ← chang from V diff

Since $PV^2 = cst$

P diff + V diff = 0

Formula for τ is derived from it.

Simple harmonic motion is an approximation, since it's clearly damped. [but only ω | τ is wanted which is not affected much.]

but τ has discrete values so a loss of precision isn't a big deal?

not for a non pure gas like air?

given only d $\quad A = \pi \left(\frac{d}{2}\right)^2$

$$P = P_0 + \frac{mg}{A}$$

in Pa convert to KPa $\quad \delta A = \frac{2 \cdot A}{d} \cdot \delta d$

$$\delta P^2 = \delta P_0^2 + \left(\frac{\delta m g}{A}\right)^2 + \left(\frac{\delta A \, mg}{A^2}\right)^2$$

↓

? not in csv.

$$\delta \tau^2 = (4\pi^2)^2 \left[\left(\frac{\delta m \cdot V}{A^2 P \tau^2}\right)^2 + \left(\frac{\delta V m}{A^2 P \tau^2}\right)^2 + \left(\frac{\delta P \, mV}{A^2 P^2 \tau^2}\right)^2 + \left(\frac{2 \delta A \, mV}{A^3 P \tau^2}\right)^2 + \left(\frac{2 \delta \tau^2 \, mV}{A^2 P \tau^3}\right)^2 \right]$$

getting τ

python curve fit? use damped or not?

then $\delta\tau$ is easy since ω is a parameter and the cov matrix is given

$$y = e^{-\gamma t} \cdot \left(A\cos\Omega t + B\sin\Omega t\right) + \boxed{y_0}$$

doesn't "center" at 0...

then $\tau = \frac{2\pi}{\Omega}$

$$\delta\tau = \delta\Omega \cdot \frac{\tau}{\Omega}$$