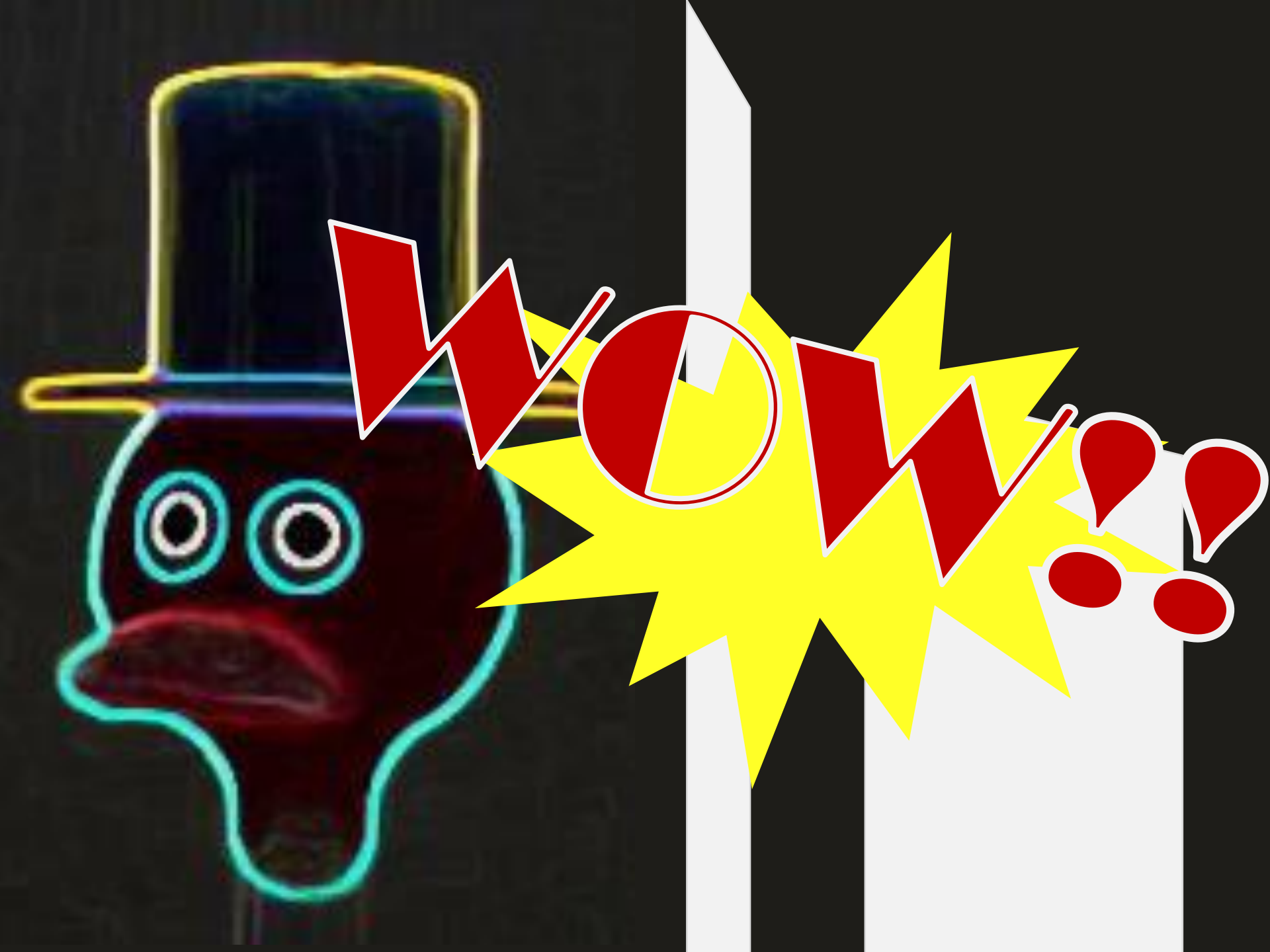
生科系

朱彦如

周霈


WOW!!!

Drinkin' Bird

時間暫停

示範

時間開始

About A Drinkin' Bird

HOW DOES IT WORK?

ANSWER

Saturated Vapor Pressure

上
下
A
上
下
B

Equ. Of

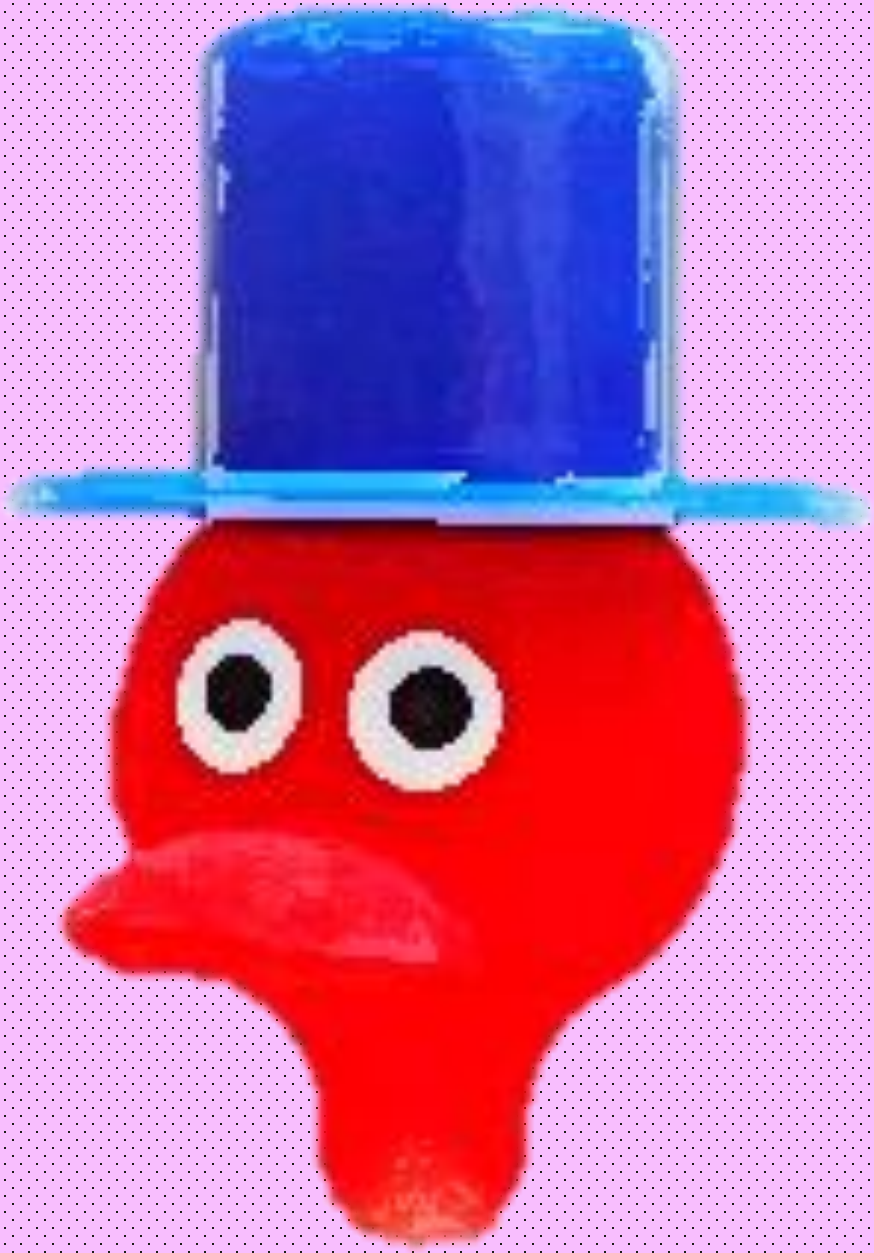
T & P

$$\ln(P1/P2)=(L/R)*(1/T1-1/T2)$$

About PV=NRT

COMMON MYTH

Isobaric Process



違う

WHY?

BECAUSE

假設溫差

$$\Delta T = 10K$$

$$\frac{V_{上}}{V_{下}} = \frac{(273+30)}{(273+20)}$$

ANS:1.034

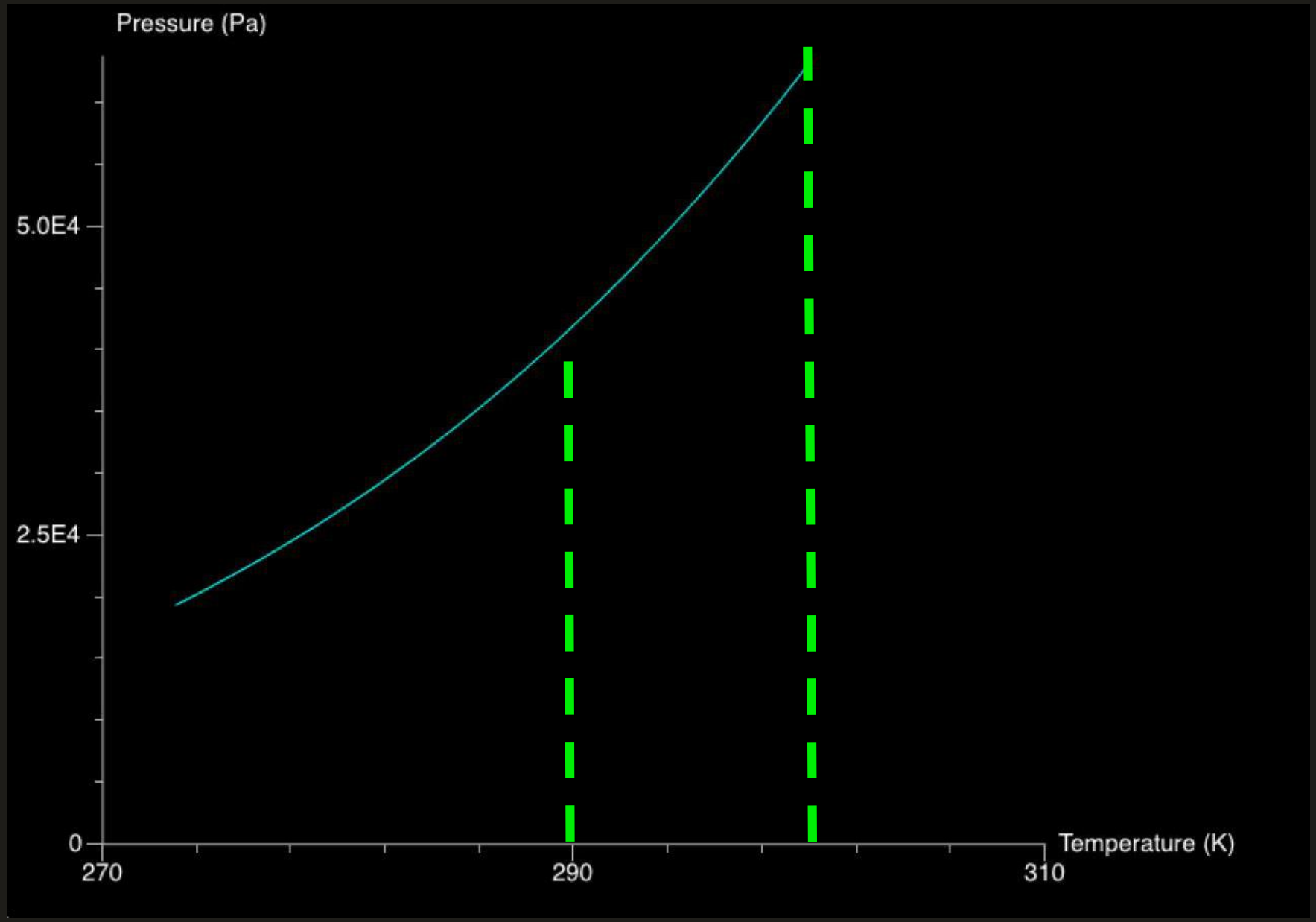
$\Delta V = 3.4\%$

petit

小

Saturated Vapor Pressure

飽和蒸汽壓


Pressure (Pa)
5.0E4
2.5E4
0
270
290
310
Temperature (K)

$$\Delta P/P = 3.0e4 / 3.5e4$$

ANS:0.857

$$\Delta V = 85.7\%$$

modeling

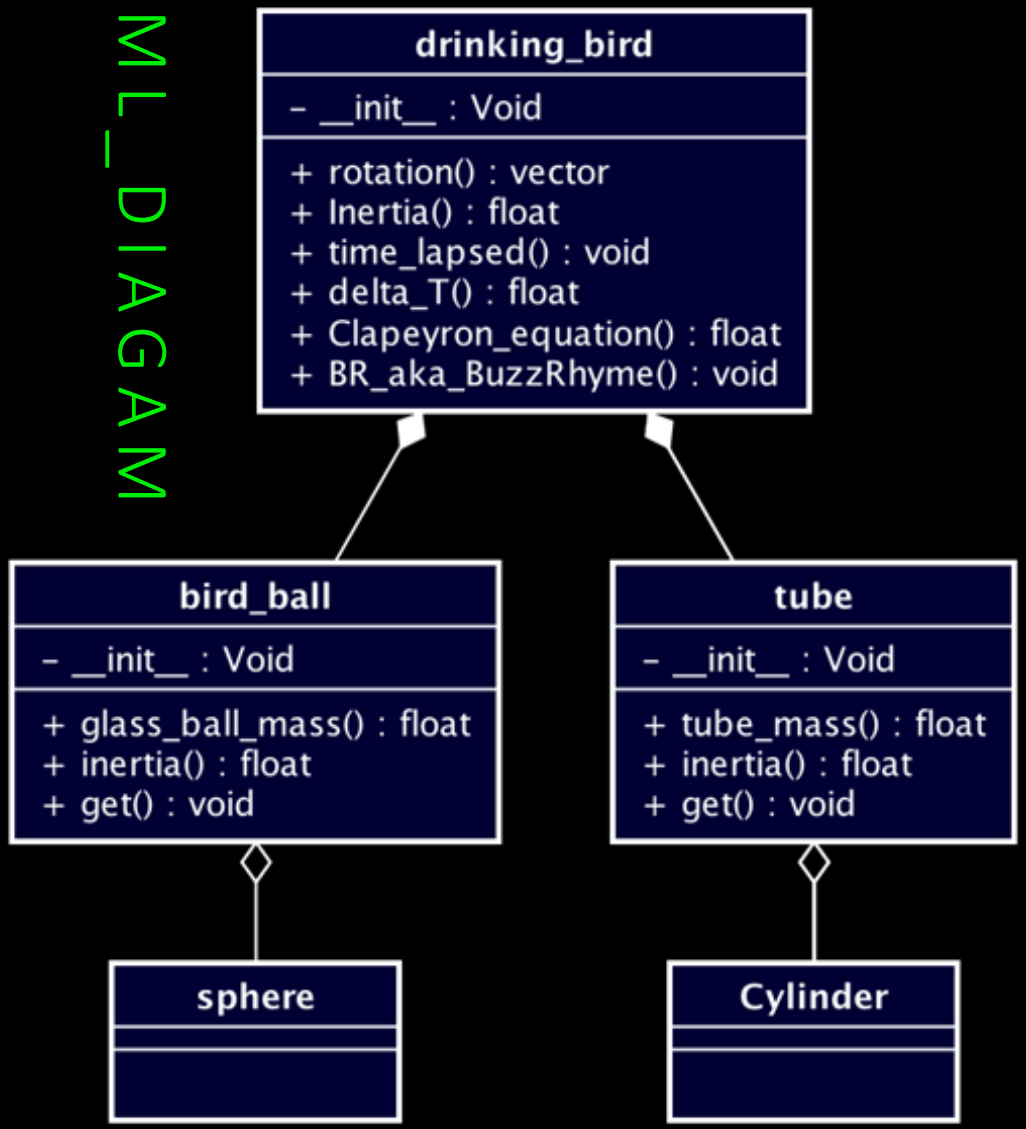
模擬

code

程式碼

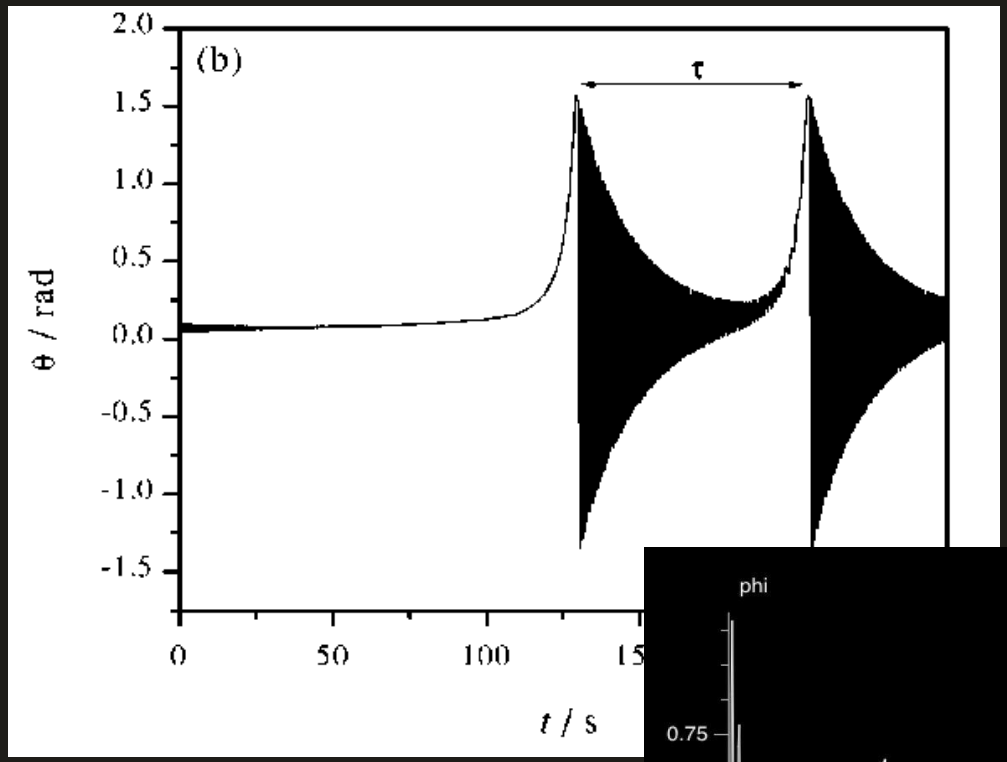
structure
架構

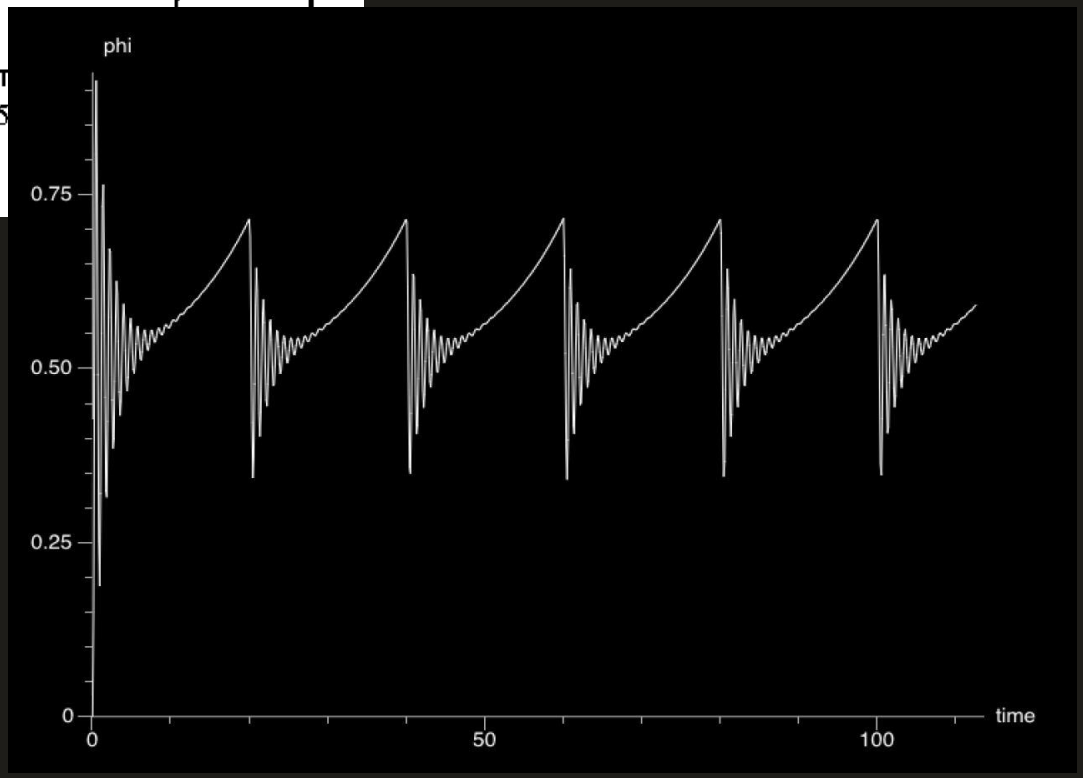
UML_DIAGAM

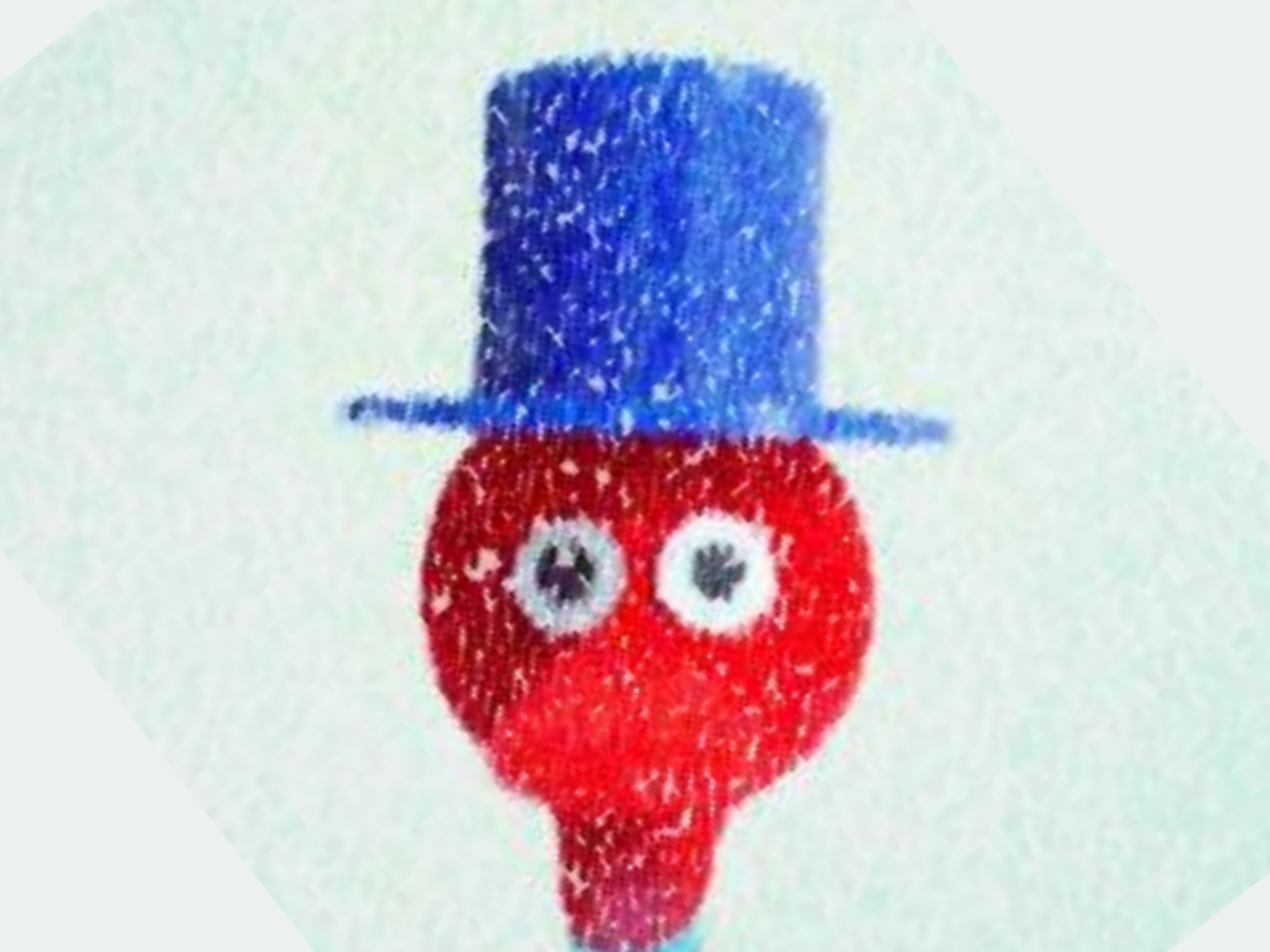

drinking_bird
- __init__ : Void
+ rotation() : vector
+ Inertia() : float
+ time_lapsed() : void
+ delta_T() : float
+ Clapeyron_equation() : float
+ BR_aka_BuzzRhyme() : void
bird_ball
- __init__ : Void
+ glass_ball_mass() : float
+ inertia() : float
+ get() : void
tube
- __init__ : Void
+ tube_mass() : float
+ inertia() : float
+ get() : void
sphere
Cylinder

執行
Execution

展示
Demonstration


(b)
τ
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
θ / rad
0
50
100
t / s


phi
0.75
0.50
0.25
0
0
50
100
time



Experiments with the drinking bird,
J. Guemez , R. Valienteb, C. Fiolhais and M. Fiolhais

The thermodynamics of the drinking bird toy,
Lily M Ng and Yvonne S Ng

http://www.mecaflux.com/en/Saturation%20vapor%20pressure.htm

reference

演示實例之理解與誤解:以「喝水鳥」與「愛情溫度計」 為例,
張慧貞

https://zh.wikipedia.org/wiki/%E5%85%8B%E5%8A%B3%E4%BF%AE%E6%96%AF%EF%BC%8D%E5%85%8B%E6%8B%89%E4%BD%A9%E9%BE%99%E6%96%B9%E7%A8%8B

謝謝

Grazie!