# Content

[Content 0](#_Toc58179098)

[Horiz beam 2 diag wires 0](#_Toc58179099)

[Diag beam fless wall rgh floor 1](#_Toc58179100)

[Horiz beam rgh wall diag wire 1](#_Toc58179101)

[SHM spring frictionless floor 2](#_Toc58179102)

[Two+ particles with velocity 3](#_Toc58179103)

[Hydrostatics 3](#_Toc58179104)

[Volumetric flow rate 5](#_Toc58179105)

[PMx – passanger I/O v1 7](#_Toc58179106)

[PMx – passanger I/O v2.1 7](#_Toc58179107)

[Phase change 8](#_Toc58179108)

[RC circuit: 1st order 8](#_Toc58179109)

[Series RC charge-discharge 9](#_Toc58179110)

[Lithium batteries 9](#_Toc58179111)

[Notes 9](#_Toc58179112)

[Version 9](#_Toc58179113)

# Horiz beam 2 diag wires

*x*

*y*

*z*



*m*, *L*

*T*2

*w* = *mg*

*l*1

*l*2

*O*

*A*

*B*

*C*

*D*

*E*

*T*1

*θ*1

*θ*2

*m*, *L*

*l*1

*l*2

*O*

*A*

*B*

*C*

*D*

*θ*1

*θ*2

*x*

*y*

*z*



*m*, *L*

*w* = *mg*

*l*1

*l*2

*O*

*A*

*B*

*C*

*D*

*E*

*T*1 cos *θ*1

*θ*1

*θ*2

*T*2 cos *θ*2

*T*2 sin *θ*2

*T*1 sin *θ*1

*l*1

*l*2

*O*

*B*

*D*

*T*2 sin *θ*2

*T*1 sin *θ*1

*w*

*l*1

*l*2

*O*

*B*

*D*

*T*2 sin *θ*2

*w*

*l*1

*l*2

*O*

*B*

*D*

*T*1 sin *θ*1

+

+

+

+

+

+

–

–

–

# Diag beam fless wall rgh floor

*x*

*y*

*z*



*m*, *L*

*μ* ≠ 0

*θ*

*μ* = 0

*w* = *mg*

*N*floor

*N*wall

*f*floor

*A*

*B*

*O*

*lw,A* = ½ *L* cos *θ*

*lN*floor*,A* = *L* cos *θ*

*lf*floor*,A* = *L* sin *θ*

*m*, *L*

*μ* ≠ 0

*μ* = 0

*A*

*B*

*O*

# Horiz beam rgh wall diag wire

*x*

*y*

*z*



*m*, *L*

*μ* ≠ 0

*θ*

*w* = *mg*

*TB*

*N*wall

*f*wall

*A*

*B*

*O*

½ *L*

*TB* sin *θ*

*TB* cos *θ*

*m*, *L*

*μ* ≠ 0

*θ*

*O*

½ *L*

*B*

*A*

# SHM spring frictionless floor



*μ* = 0

*k*

*m*

*F* = –*k*(*x* – *x*0)

*x* = *x*0

*x* = *x*0

*x* > *x*0

*x* >> *x*0

*x* > *x*0

*x* = *x*0

*v* > 0

*v* = 0

*v* < 0

*v* < 0

*x* < *x*0

*x* << *x*0

*x* < *x*0

*x* = *x*0

*v* < 0

*v* = 0

*v* > 0

*v* > 0

*t*  = 0

*t*  = *T* / 8

*t*  = *T* / 4

*t*  = 3*T* / 8

*t*  = *T* / 2

*t*  = *T* / 2

*t*  = 5*T* / 8

*t*  = 3*T* / 4

*t*  = 7*T* / 8

*t*  = *T*

*x*

*t*

0

*T* / 4

*T* / 2

*x*

*t*

*T* / 2

3*T* / 4

*T*

*t*

*x*

*A*

–*A*

*F* < 0

*F* << 0

*F* < 0

*F* = 0

*F* = 0

*F* = 0

*F* > 0

*F* >> 0

*F* > 0

*F* = 0

*v* > 0

*v* < 0

*x*

*y*

*z*

# Two+ particles with velocity

*x*

*y*

*z*



*Dj, mj*

*Di, mi*



*Dk, mk*

# Hydrostatics

*x*

*y*

*z*

*x*

*y*

*z*



*l*

*w*

*h*

*h*

*A*

*A*



*h* //

*x*

*y*

*z*



*h*

*A*

*ρb*

*y*



*y*

*A*



*ρf*

*y*

*h*

*y*

*h*

*P*0

*ρair*

*ρf*

*P*0 = 1 atm = 101325 Pa (or N/m2) ≈ 105 Pa = 105 N/m2



*y*

*h*1

*P*0

*ρair*

*ρf*1

*ρf*2

*h*2



*h*1

*h*2

*h*3

*P*0

*P*0

4

5

1

2

3

Δ*h*



*H*1

*H*2

*H*3

*P*0

0

1

2

3

4

*x*

*y*

*z*



*y*

*ρ*1

*ρ*2

*ρ*3













*H*

*P*0

0

1

2

*x*

*y*

*z*



*y*

*ρ*

*H*1

*H*2

*P*0

0

1

2

3

*x*

*y*

*z*



*y*

*ρ*1

*ρ*2

*x*

*y*

*z*



*P*1

*P*2

*H*1

*H*2

Δ*h*

*ρ*

1

3

2

4

*x*

*y*

*z*



*P*0

*P*1

*H*0

*H*1

Δ*h*

*ρ*

0

2

1

3

*x*

*y*

*z*



*P*0

*H*4

*H*1

Δ*h*

*ρ*2

4

5

1

3

2

*H*2

*ρ*1

# Volumetric flow rate

*v*1

*v*2

*v*1 Δ*t*

*v*2 Δ*t*

*A*1

*A*2

*v*1

*v*2

*A*1

*A*2

*v*1 Δ*t*

*v*2 Δ*t*

*x*

*y*

*z*

*x*

*y*

*z*



*v*1

*A*1

*A*2

*A*3

*v*2

*v*3



*Ai*

*Af*



*v* = *v*(*A*)

*A* = *A*(*x*)

*x*

*y*

*z*



*y*1

*y*2

*A*1

*A*2

*v*1

*v*2

*p*1

*p*2

*x*

*y*

*z*



*y*1

*y*2

*A*1

*A*2

*v*1

*v*2

*p*in

*p*out

*p*1

*p*2

*p*0

*ρ*

*x*

*y*

*z*



*y*1

*y*2

*A*1

*A*2

*v*1

*v*2

*p*0

Δ*h*

*p*1

*p*2

*p*in

*p*out

*h*1

*h*2

*ρ*

*x*

*y*

*z*



*y*1

*y*2

*A*1

*A*2

*v*1

*v*2

*p*0

Δ*h*

*p*1

*p*2

*p*in

*p*out

*h*1

*h*2

*ρ*

*ρ*u

# PMx – passanger I/O v1

PM10

*N*STA,in

*N*STA,out

*N*STA

PM2.5

*N*STA,0

+

+

+

*h*prep

*v*wind

*T*env

*p*env

RHenv

–

–

–

–

–

+

*n*SARC-CoV-2

*N*case

*P*sub-district

+

+

+

+

–

–

*N*inf

+

+

+

*N*death

+

–

+

HPTEMPS, HPMASKU, HPHANDW, HPRAPDT, HPSWABT, HPSOCD, ..

–

+

IQ, EQ, SQ, TQ

+

# PMx – passanger I/O v2.1

*n*SARC-CoV-2

*N*case

*P*sub-district

+

*N*inf

+

+

*N*death

+

–

+

HPTEMPS, HPMASKU, HPHANDW, HPRAPDT, HPSWABT, HPSOCD,   
..

–

*R*

*B*

# Phase change

*T*melting

*T*solid

*T*liquid

*T*boiling

*T*gas

*t*, *Q*

*T*

*dQ*2/*dt*2 = 0

*T*

*Q*

*T*melting

*T*boiling

gas (g)

liquid (l)

solid (s)

*L*liquid-gas

*L*solid-liquid

*c*solid

*c*liquid

*c*gas

*θ*s

*θ*l

*θ*g

# RC circuit: 1st order

*S*

*ε*

*C*

*R*

*S*

*ε*

*C*

*R*

# Series RC charge-discharge

*S*

*ε*

*C*

*R*

*S*

*ε*

*C*

*R*

*I*

+

–

*S*

*C*

*R*

+

–

*S*

*C*

*R*

+

–

*I*

# Lithium batteries

*C*bulk

*R*pol

*V*0

+

–

*C*surf

*R*int

*V*0

+

–

*ε*

*I*

*I*

# Notes

* 130% as for jekyll blog with MathJax
* Save as 0000x first then save as back to 0000, remove 0000x then, x = i

# Version

20201110, 20201113, 20201117, 20201119, 24, 20201206