

one24thoutofphase Mechanical Principle between a Crank Circle connected to a Collapsible Square as discovered in EB pendulum

Changes to this layout : 31MAY2021

A0 size Layout of the , one24thoutofphase , geometry - maths steps to calculate, xyLR co-ordinates, of free points of collapsible square giving rise to the varying curve shapes, named Twinwaves or the Twinesine Principle as a hardwired mechanical fact, that all resolve to a sine wave when subtracted from each other within TWIN wave system. Experimental application to 'trap' the Mechanical "Bubble - Inequality" is shown on page 10.

EB_New_Exp_01

EB_New_Exp_02

EB_New_Exp_03

EB_New_Exp_04

EB_New_Exp_05

The EB 1/24th TWIN WAVE as a Mechanical Discovery
(A SeeSaw Comparison are used as a Simplified Explanation)

Please START here from POINT 01

POINT 01 :
DISPLACEMENT on one side is IDENTICAL to the displacement on the other side even though it takes place in a REVERSE MIRROR fashion.

POINT 02 :
So to put it another way - DISPLACEMENT = distance travelled on one end, is the exact same as on the opposite end of the equal length balanced centre pivoted seesaw.

POINT 03 :
NOW lets change the simple beam to a Collapsible Square fixed to a Crank (or Circle) and put motion on the whole system through the Crank.

POINT 04 :
The 1/24th discovery NOW we discover that the DISPLACEMENT on one side LEFT as opposed to RIGHT is NOT IDENTICAL to the displacement on the other side while the rest of the motion still takes place in a REVERSE MIRROR fashion. ONE POINT - CRANK OUT OF PHASE or BECOME (JUMP actually) 1/24 OUT OF STEP with the opposite POINT.

POINT 05 :
NOW lets put Equal FORCE on the LEFT & RIGHT points to ATTEMPT to reach EQUILIBRIUM of FORCE on the SQUARE.

The EB 1/24th TWIN WAVE Calculations PAGE 01
This is the EB Calculation 1st breakup page. This will be broken up into simpler sections per page that will show how the Calculations add up to this Full page.

01 BELOW : GEOMETRIC DEDUCTIONS TO GET TO FREE POINTS COORDINATES
02 $R = 3.1415926535897932$

03 Converting Degrees to Radians
 $\text{angle} = (\text{AngleCR} \cdot \pi) / 180$

04 The length of Triangle of Crank Swing
 $b1 = (\text{CrankR} \cdot \sin(\text{angle}))$

05 X coordinate of Crank Swing
 $x(\text{CR}) = x(\text{Center}) + a$

06 Y coordinate of Crank Swing
 $y(\text{CR}) = y(\text{Crosshair}) - b1$

07 Triangle in Square Defined
 $b2 = y(\text{Crosshair}) - b1 - y(\text{Crosshair})$

08 Side of Top Triangle
 $c2 = \text{SQRT}(a^2 + b2^2)$

09 Half of Side/Top Triangle
 $C2 = c2 / 2$

10 Opposite Side
 $\text{angle} = (\text{CR} \cdot \sin(\text{angle})) / C2$

11 Half of Chord
 $b1 = \text{SQRT}(C2^2 - a^2)$

12 BELOW : CALCULATING COORDINATES FOR TRACE CIRCLE (needed for FREE POINT Calc)

13 $x(\text{Small}) = C2 \cdot \sin(\text{angle2})$

14 $y(\text{Small}) = C2 \cdot \cos(\text{angle2})$

15 Y distance to trace circle centre
 $y(\text{Small}) = y(\text{Crosshair}) - C2$

16 X Value for Trace Circle swing
 $x(\text{Small}) = x(\text{Center}) + x(\text{Small})$

17 Y Value for trace circle swing
 $y(\text{Small}) = y(\text{Crosshair}) - y(\text{Small})$

18 BELOW : CALCULATING COORDINATES FOR SQUARE LEVER 2 SETS OF X & Y COORDINATES

19 $x(\text{LR}) = x(\text{TR}) - W \cdot \cos(\text{angle2})$

20 $x(\text{RR}) = x(\text{TR}) + W \cdot \sin(\text{angle2})$

21 $x(\text{LR}) = x(\text{TR}) - W \cdot \cos(\text{angle2})$

22 $y(\text{LR}) = y(\text{TR}) - W \cdot \sin(\text{angle2})$

23 HOW TO CALCULATE PENDULUM EXTENSIONS: x & y POINTS DEPENDENT ONLY ON VARIABLES W, C2 & angle2.

24 $c(\text{big}) = \text{SQRT}(a^2 + b2^2)$

25 $a(\text{big}) = (C3 + c(\text{big}) \cdot \sin(\text{angle2}))$

26 $a(\text{big}) = (C3 + c(\text{big}) \cdot \cos(\text{angle2}))$

27 $x(\text{LR}) = x(\text{Center}) - a(\text{big})$

28 $y(\text{LR}) = y(\text{Crosshair}) + b(\text{big})$

29 $\text{Dist2}(\%) = (\text{SQRT}(b(\text{big})^2 - (W \cdot \sin(2)) + C3$

The EB 1/24th TWIN WAVE as a Mechanical Discovery
This is the EB Calculation 2nd breakup page. This will start to show with a simpler section that will indicate how the Calculations add up to the Full page. We start with the 1st step : the ROTATION CALCULATION.

06 $(x(\text{Zero}) : y(\text{Zero}))$

07 $(x(\text{CR}) : y(\text{CR}))$

08 $(x(\text{LR}) : y(\text{LR}))$

09 $(x(\text{RR}) : y(\text{RR}))$

10 $(x(\text{TR}) : y(\text{TR}))$

11 $(x(\text{CR}) : y(\text{CR}))$

12 $(x(\text{LR}) : y(\text{LR}))$

13 $(x(\text{RR}) : y(\text{RR}))$

14 $(x(\text{TR}) : y(\text{TR}))$

15 $(x(\text{CR}) : y(\text{CR}))$

16 $(x(\text{LR}) : y(\text{LR}))$

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