ANGLE POUR CHUTE A DISTANCE MAXIMALE (1)

$$\frac{Vi}{g}\left(Vi(1-2\sin^2\alpha) + \frac{\sin\alpha\,(Vi^2(1-\sin^2\alpha)-2yog)}{\sqrt{Vi^2\sin^2\alpha+2yog}} \right) = 0$$

$$\frac{Vi^2(1-2\sin^2\alpha)}{g} = -\frac{Vi\sin\alpha\,(Vi^2(1-\sin^2\alpha)-2yog)}{g\sqrt{Vi^2\sin^2\alpha+2yog}}$$

$$Vi^2(1-2\sin^2\alpha)\,g\sqrt{Vi^2\sin^2\alpha+2yog} = -gVi\sin\alpha\,(Vi^2(1-\sin^2\alpha)-2yog)$$

$$Vi^2(1-2\sin^2\alpha)\sqrt{Vi^2\sin^2\alpha+2yog} = -Vi\sin\alpha\,(Vi^2(1-\sin^2\alpha)-2yog)$$

$$(Vi^2(1-2\sin^2\alpha)\sqrt{Vi^2\sin^2\alpha+2yog})^2 = (-Vi\sin\alpha\,(Vi^2(1-\sin^2\alpha)-2yog))^2$$

$$((Vi^2)^2(1-2\sin^2\alpha)^2(Vi^2\sin^2\alpha+2yog) = (-Vi\sin\alpha\,(Vi^2(1-\sin^2\alpha)-2yog))^2$$

$$Vi^4(1-2\sin^2\alpha)^2(Vi^2\sin^2\alpha+2yog) = (-Vi\sin\alpha\,(Vi^2(1-\sin^2\alpha)-2yog))^2$$

Développement du premier membre :

$$Vi^4(1-2\sin^2\alpha)^2(Vi^2\sin^2\alpha+2yog) = Vi^4(1-4\sin^2\alpha+4\sin^4\alpha)(Vi^2\sin^2\alpha+2yog)$$

$$= (Vi^4 - Vi^4 4\sin^2\alpha + Vi^4 4\sin^4\alpha)(Vi^2\sin^2\alpha+2yog)$$

$$= Vi^6\sin^2\alpha + Vi^4 2yog - Vi^6 4\sin^4\alpha - Vi^4 4\sin^2\alpha\,2yog + Vi^6 4\sin^6\alpha + Vi^4 4\sin^4\alpha 2yog$$

Développement du seconde membre :

$$(-Vi\sin\alpha\,(Vi^2(1-\sin^2\alpha)-2yog))^2 = (-Vi^3\sin\alpha + Vi^3\sin^3\alpha + Vi\sin\alpha\,2yog)^2$$

$$= (-Vi^3\sin\alpha + Vi^3\sin^3\alpha + Vi\sin\alpha\,2yog)(-Vi^3\sin\alpha + Vi^3\sin^3\alpha + Vi\sin\alpha\,2yog)$$

$$= Vi^6\sin^2\alpha + Vi^6\sin^6\alpha + Vi^2\sin^2\alpha\,4yo^2g^2 - 2Vi^6\sin^4\alpha - 2Vi^4\sin^2\alpha\,2yog + 2Vi^4\sin^4\alpha\,2yog$$

Normalement on est bon.

On a donc : (second membre = premier membre)

$$Vi^6\sin^2\alpha + Vi^6\sin^6\alpha + Vi^2\sin^2\alpha\,4yo^2g^2 - 2Vi^6\sin^4\alpha - 2Vi^4\sin^2\alpha\,2yog + 2Vi^4\sin^4\alpha\,2yog$$

$$= Vi^6\sin^2\alpha + Vi^4 2yog - Vi^6 4\sin^4\alpha - Vi^4 4\sin^2\alpha\,2yog + Vi^6 4\sin^6\alpha + Vi^4 4\sin^4\alpha 2yog$$

Donc je prend une nouvelle page en paysage ;-)