

ANGLE POUR CHUTE A DISTANCE MAXIMALE (1)

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

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

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

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

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

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

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

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 :

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

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

$$= Vi^6 \sin^2 \alpha + Vi^6 \sin^6 \alpha + Vi^2 \sin^2 \alpha 4yog^2 + 2Vi^3 \sin \alpha (Vi^3 \sin^3 \alpha) + 2Vi^3 \sin \alpha (Vi \sin \alpha 2yog) + 2Vi^3 \sin^3 \alpha (Vi \sin \alpha 2yog)$$

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

Normalement on est bon.

On a donc :

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

$$Vi^6 \sin^2 \alpha + Vi^6 \sin^6 \alpha + Vi^2 \sin^2 \alpha 4yog^2 + 2Vi^6 \sin^4 \alpha + 2Vi^4 \sin^2 \alpha 2yog + 2Vi^4 \sin^4 \alpha 2yog$$

Donc je prend une nouvelle page en paysage ;-)