

Pensieve header: A bad interaction of Series and degree bounds.

$$f = \frac{\text{Cosh}\left[\hbar \left(\frac{\epsilon-t}{2} + \epsilon a\right)\right] - \text{Cosh}\left[\hbar \sqrt{\left(\frac{t-\epsilon}{2}\right)^2 + \epsilon \omega}\right]}{\hbar \text{Sinh}\left[\frac{-\epsilon \hbar}{2}\right] (\omega - \epsilon a^2 + (t - \epsilon) a)};$$

`Series[f, {ħ, 0, 2}]`

$$1 + \frac{1}{24} (t^2 - 2 t \epsilon - 2 a t \epsilon + 2 a \epsilon^2 + 2 a^2 \epsilon^2 + 2 \epsilon \omega) \hbar^2 + O[\hbar]^3$$

`ε /: εd. /; d > 2 := 0;`

`Series[f, {ħ, 0, 2}]`

$$1 + \frac{(-a t^3 + 3 a t^2 \epsilon + 3 a^2 t^2 \epsilon - t^2 \omega + 2 t \epsilon \omega - 2 \epsilon \omega^2) \hbar^2}{24 (-a t + a \epsilon + a^2 \epsilon - \omega)} + O[\hbar]^3$$

? ε

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Global`ε
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`εd. /; d > 2 := 0`

`Clear[ε]; ? ε`

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Global`ε
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$$\text{Series}\left[\left(\frac{1}{24} (t^2 - 2 t \epsilon - 2 a t \epsilon + 2 a \epsilon^2 + 2 a^2 \epsilon^2 + 2 \epsilon \omega) \hbar^2\right) - \left(\frac{(-a t^3 + 3 a t^2 \epsilon + 3 a^2 t^2 \epsilon - t^2 \omega + 2 t \epsilon \omega - 2 \epsilon \omega^2) \hbar^2}{24 (-a t + a \epsilon + a^2 \epsilon - \omega)}\right), \{\epsilon, 0, 2\}\right] // \text{Normal} // \text{Simplify}$$

$$\frac{a (1 + 3 a + 2 a^2) t \epsilon^2 \hbar^2}{12 (a t + \omega)}$$