Pensieve header: Simplifying the messy functions in the symmetric dequantizator.

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FS = FullSimplify;
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$$g = \sqrt{\left(\left(\text{Cosh}\left[\frac{\hbar}{2}\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}\right]-\text{Cosh}\left[\frac{\hbar}{2}\left(t-(2a+\gamma)\epsilon\right)\right]\right)\Big/\left(\text{Sinh}\left[\frac{\gamma\epsilon\hbar}{2}\right]\left(t(2a+\gamma)-2a(a+\gamma)\epsilon+2\varpi\right)\hbar/(2\gamma)\right)\right)}$$

$$\sqrt{2}\sqrt{\left(\left(\gamma\left(-\text{Cosh}\left[\frac{1}{2}\left(t-(2a+\gamma)\epsilon\right)\hbar\right]+\text{Cosh}\left[\frac{1}{2}\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}\,\hbar\right]\right)\text{Csch}\left[\frac{\gamma\epsilon\hbar}{2}\right]\right)\Big/\left(\left(t(2a+\gamma)-2a(a+\gamma)\epsilon+2\varpi\right)\hbar\right)\right)}$$

$$\text{FS}\left[\sqrt{a^2+\epsilon b} == a+\frac{\epsilon b}{a+\sqrt{a^2+\epsilon b}}\right]$$

$$\text{FS}\left[\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi} == t+\frac{\epsilon\left(4\varpi+\epsilon\gamma^2\right)}{t+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}\right]$$

True

$$\text{FS}\left[t+\frac{\epsilon\left(4\varpi+\epsilon\gamma^2\right)}{t+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}\right]$$

$$\sqrt{t^2+\epsilon\left(\gamma^2\epsilon+4\varpi\right)}$$

$$\text{FS}\left[g == \sqrt{\left(\left(\text{Cosh}\left[\frac{\hbar}{2}\left(t+\frac{\epsilon\left(4\varpi+\epsilon\gamma^2\right)}{t+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}\right)\right]-\text{Cosh}\left[\frac{\hbar}{2}\left(t-(2a+\gamma)\epsilon\right)\right]\right)\Big/\left(\text{Sinh}\left[\frac{\gamma\epsilon\hbar}{2}\right]\left(t(2a+\gamma)-2a(a+\gamma)\epsilon+2\varpi\right)\hbar/(2\gamma)\right)\right)}\right]$$

True

$$\text{FS}\left[\text{Cosh}[x]-\text{Cosh}[y] == 2\,\text{Sinh}\left[\frac{x+y}{2}\right]\text{Sinh}\left[\frac{x-y}{2}\right]\right]$$

True

$$\text{With}\left[\left\{x=\frac{\hbar}{2}\left(t+\frac{\epsilon\left(4\varpi+\epsilon\gamma^2\right)}{t+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}\right),\ y=\frac{\hbar}{2}\left(t-(2a+\gamma)\epsilon\right)\right\},\ \text{Simplify}\,/@\left\{\frac{x+y}{2},\frac{x-y}{2}\right\}\right]$$

$$\left\{\frac{1}{4}\left(2t-(2a+\gamma)\epsilon+\frac{\epsilon\left(\gamma^2\epsilon+4\varpi\right)}{t+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}\right)\hbar,\ \frac{1}{4}\epsilon\left(2a+\gamma+\frac{\gamma^2\epsilon+4\varpi}{t+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}\right)\hbar\right\}$$

$$\text{FS}\Big[g == 2\sqrt{\left(\left(\gamma\,\text{Sinh}\Big[\frac{1}{4}\left(2t-(2a+\gamma)\,\epsilon+\frac{\epsilon\,(\gamma^2\epsilon+4\varpi)}{t+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}\right)\hbar\Big]\,\text{Sinh}\Big[\frac{1}{4}\,\epsilon\left(2a+\gamma+\frac{\gamma^2\epsilon+4\varpi}{t+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}\right)\hbar\Big]\right)\Big/\left(\text{Sinh}\Big[\frac{\gamma\,\epsilon\,\hbar}{2}\Big]\,\big(t\,(2a+\gamma)-2a\,(a+\gamma)\,\epsilon+2\varpi\big)\,\hbar\right)\right)}\Big]$$

True

$$\text{FS}\Big[-(2a+\gamma)\,\epsilon+\frac{\epsilon\,(\gamma^2\epsilon+4\varpi)}{t+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}\Big]$$

$$-t-(2a+\gamma)\,\epsilon+\sqrt{t^2+\epsilon\,(\gamma^2\epsilon+4\varpi)}$$

$$\text{FS}\Big[2a+\gamma+\frac{\gamma^2\epsilon+4\varpi}{t+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}\Big]$$

$$\frac{-t+2a\epsilon+\gamma\epsilon+\sqrt{t^2+\gamma^2\epsilon^2+4\epsilon\varpi}}{\epsilon}$$