$$-\frac{1}{2\sqrt{2}\beta}\left(\alpha e^{-i\Omega t}+\alpha^{*}e^{i\Omega t}\right)\langle(-\alpha)e^{-i\Omega t}|-\alpha e^{-i\Omega t}\rangle$$

$$-\frac{i}{2\sqrt{2}\beta}\left(\alpha e^{-i\Omega t}-\alpha^{*}e^{i\Omega t}\right)\langle(-\alpha)e^{-i\Omega t}|\alpha e^{-i\Omega t}\rangle$$

$$+\frac{i}{2\sqrt{2}\beta}\left(\alpha^{*}e^{i\Omega t}-\alpha e^{-i\Omega t}\right)\langle\alpha e^{-i\Omega t}|(-\alpha)e^{-i\Omega t}\rangle.$$

<u>Usando</u>:

$$\langle\alpha e^{-i\Omega t}|\alpha e^{-i\Omega t}\rangle=\langle\alpha' e^{-i\Omega t}|\alpha' e^{-i\Omega t}\rangle=1$$

$$\langle(-\alpha)e^{-i\Omega t}|\alpha e^{-i\Omega t}\rangle=\exp\left(-2|\alpha|^{2}\right)$$

$$=\langle\alpha e^{-i\Omega t}|(-\alpha)e^{-i\Omega t}\rangle$$

Se tiene finalmente:

$$\langle X(t)\rangle=\cancel{\frac{1}{2\sqrt{2}\beta}\left(\alpha e^{-i\Omega t}+\alpha^{*}e^{i\Omega t}\right)}\cancel{-\frac{1}{2\sqrt{2}\beta}\left(\alpha e^{-i\Omega t}+\alpha^{*}e^{i\Omega t}\right)}$$

$$+\frac{i}{\sqrt{2}\beta}e^{-2|\alpha|^{2}}\left(\alpha^{*}e^{i\Omega t}-\alpha e^{-i\Omega t}\right)$$

$$=\frac{2}{\sqrt{2}\beta}e^{-2|\alpha|^{2}}\cdot\mathrm{Im}\left(\alpha e^{-i\Omega t}\right)$$