Cracow, le 19 Dec 2009

Dear Guys,
About the equality

$$\int_{\mathbb{C}} |z\rangle\, W(|z|^2)\, \langle z|\, dz = I \tag{1}$$

At this point of our discussion, one has at hand two definitions. We denote $\mathcal{H}_G$ our "untouchable" ground Hilbert space with basis of states $(|n\rangle)_{n\in\mathbb{N}}$.

First definition. —

$$(\forall n,m \in \mathbb{N})(\int_{\mathbb{C}} W(|z|^2)\, \langle n|z\rangle\langle z|m\rangle\, dz) = \langle n|m\rangle \tag{2}$$

"weak operator equality".

After our discussion with Kus. In fact the left hand side of (2) is a weak operator integration.

Second definition. —

$$(\forall \phi,\psi \in \mathcal{H}_G)(\int_{\mathbb{C}} W(|z|^2)\, \langle \phi|z\rangle\langle z|\psi\rangle\, dz) = \langle \phi|\psi\rangle \tag{3}$$

From yesterday. In fact the left hand side of (3) is a strong operator integration.

"strong operator equality".
Let us prove that, in our case the weak definition implies the strong definition and then what was computed yesterday

$$\int_{\mathbb{C}} W(|z|^2).Osc(|z|^2)\, \langle \phi|z\rangle\langle z|\phi\rangle\, dz \tag{4}$$

will always amount to zero as $W(|z|^2).Osc(|z|^2) = W_1(|z|^2) - W_2(|z|^2)$.