How to make sense of Feynman Propagator?

Schwartz 6 notes

$$D_F(x_1-x_2) = \langle 0 | T\{\phi_0(x_1)\phi_0(x_2)\}|0\rangle$$

$$= \int \frac{d^4k}{(2\pi)^4} \frac{-i}{-k^2+m^2+i\varepsilon} e^{ik(x_1-x_2)}$$

$$\Leftrightarrow \tilde{D}_F(k) = \frac{-i}{-k^2+m^2+i\varepsilon},$$

Then $(\Box+m^2)\tilde{D}_F(k) = -i$

$$= -i\tilde{\delta}(k)$$

For any function, $\tilde{f}(\Box+m^2)f(x) = (-k^2+m^2)\tilde{f}(k)$

$$\Rightarrow \boxed{(\Box+m^2)D_F^{(x_1-x_2)} = -i\delta(x_1-x_2)}$$

$$\Rightarrow (\Box+m^2)D_F(x_1-x_2) = -i\delta(x_1-x_2), \text{ or}$$

$$i(\Box+m^2)D_F(x_1-x_2) = \delta(x_1-x_2)$$

That is, iD_F satisfies free eqn except at $\boxed{x_1=x_2}$

Or, iD_F propagates as a free particle at all spacetime except at $x_1=x_2$.