Time ordering gives Feynman propagator

$$\Delta_F(x,t) \equiv \langle 0|T[\phi_1\phi_2]|0\rangle = i\int \frac{1}{(2\pi)^2} dk\,dw\, \frac{e^{i(kx-wt)}}{\omega^2-\omega_k^2+i\varepsilon}$$

and $\Delta_F(x,t) = \Delta_F(-x,-t)$

$$\langle 0|\phi_1\phi_2|0\rangle\theta(\Delta t) = \int \frac{dk}{2\pi}\frac{1}{2\omega_k} e^{i(k\Delta x-\omega\Delta t)}\theta(\Delta t)$$

$$= \int \frac{dk}{2\pi}\frac{1}{2\omega_k}\frac{i}{2\pi}\int dw \left(-\frac{1}{\omega+\omega_k-i\varepsilon}\right)e^{-i(k\Delta x-\omega\Delta t)}$$

$$\langle 0|\phi_2\phi_1|0\rangle\theta(-\Delta t) = \int \frac{dk}{2\pi}\frac{1}{2\omega_k} e^{-i(k\Delta x-\omega\Delta t)}\theta(-\Delta t)$$

$$= \int \frac{dk}{2\pi}\frac{1}{2\omega_k}\frac{i}{2\pi}\int dw \left(\frac{1}{\omega-\omega_k+i\varepsilon}\right)e^{-i(k\Delta x-\omega\Delta t)}$$

$$\langle 0|T[\phi_2\phi_1]|0\rangle = \int \frac{dk}{2\pi}\frac{1}{2\omega_k}\frac{i}{2\pi}\int dw \left(\frac{2(\omega_k-i\varepsilon)}{\omega^2-(\omega_k-i\varepsilon)^2}\right)e^{-i(k\Delta x-\omega\Delta t)}$$

$$= i\int \frac{dk\,dw}{(2\pi)^2}\frac{\exp(i(k\Delta x-\omega\Delta t)}{\omega^2-\omega_k^2+i\varepsilon}$$