$$
\begin{aligned}
R_{\tilde{H}}(f_1, f_2; \Delta t) &= E\left[\tilde{H}^*(f_1; t)\tilde{H}(f_2; t+\Delta t)\right] \\
&= \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} R_{\tilde{h}}(\tau_1, t; \tau_2, t+\Delta t)e^{j2\pi(f_1\tau_1 - f_2\tau_2)}d\tau_1 d\tau_2 \\
&= \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} r_{\tilde{h}}(\tau_1; \Delta t)\delta(\tau_1 - \tau_2)e^{j2\pi(f_1\tau_1 - f_2\tau_2)}d\tau_1 d\tau_2 \\
&= \int_{-\infty}^{\infty} r_{\tilde{h}}(\tau_1; \Delta t)e^{j2\pi(f_1 - f_2)\tau_1}d\tau_1 \qquad \boxed{\Delta f = f_2 - f_1} \\
&= \int_{-\infty}^{\infty} r_{\tilde{h}}(\tau_1; \Delta t)e^{-j2\pi(\Delta f)\tau_1}d\tau_1 = r_{\tilde{H}}(\Delta f; \Delta t)
\end{aligned}
$$

For zero-mean, stationary, uncorrelated scattering channels, autocorrelation function of the channel transfer function only depends on time difference and frequency difference.

It is thus named spaced-frequency spaced-time correlation function.