

The Wiener-Khinchin theorem states that the covariance kernel of a stationary Gaussian process given as function of the distance between points t

$$K(t) = \frac{1}{2\pi} \int_{-\infty}^{\infty} e^{i\omega t} S(\omega) d\omega \quad (1)$$

is the inverse Fourier transform of its power spectral density

$$S(\omega) = \int_{-\infty}^{\infty} e^{-i\omega t} K(t) dt \quad (2)$$

which is likewise a function of frequency/momentum defined by the Fourier transform of the covariance kernel function.