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Gaussian Processes [Dynamic]

JOURNAL ARTICLE

ON STATIONARY PROCESSES IN THE PLANE

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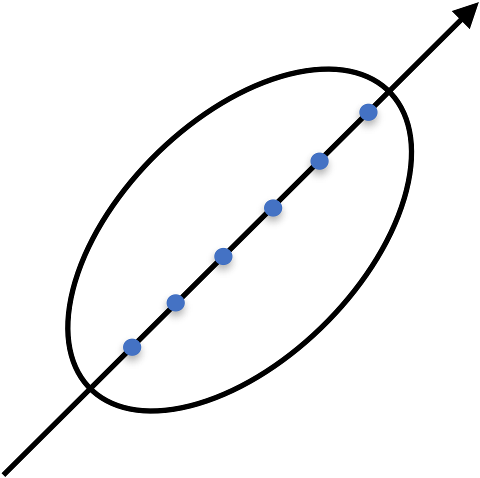
P. WHITTLE

Biometrika, Volume 41, Issue 3-4, 3 December 1954, Pages 434–449,
https://doi.org/10.1093/biomet/41.3-4.434
Published: 03 December 1954



$$f_t = L^{-1}(T)\varepsilon_t$$


White Noise ε
Filter L^{-1}
Target Process f

Whittle, P. (1954). On stationary processes in the plane, *Biometrika.* pp. 434–449.

$$
\begin{aligned}
L(T)f_t &:= [-aT^{-1} + T^0 - bT]f_t \\
&= -af_{t-1} + f_t - bf_{t+1} = \varepsilon_t
\end{aligned}
$$

Filter L yields the transfer function $L(e^{i\omega}) = \sum_{j=-\infty}^{\infty} a_j e^{i\omega j}$.

So the spectral density is $S_f(\omega) = \dfrac{\sigma^2}{L(e^{i\omega})L(e^{-i\omega})}$.

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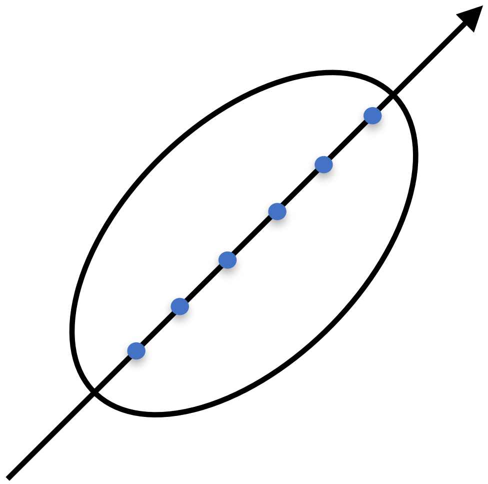

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White Noise ε $\xrightarrow{\text{Filter } L^{-1}}$ Target Process f

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Hartikainen, J. and Särkkä, S. (2010). Kalman filtering and smoothing solutions to temporal Gaussian process regression models, *2010 IEEE international workshop on machine learning for signal processing*, IEEE, pp. 379– 384.

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