L11: ACF, PSD, AR, MA and ARMA

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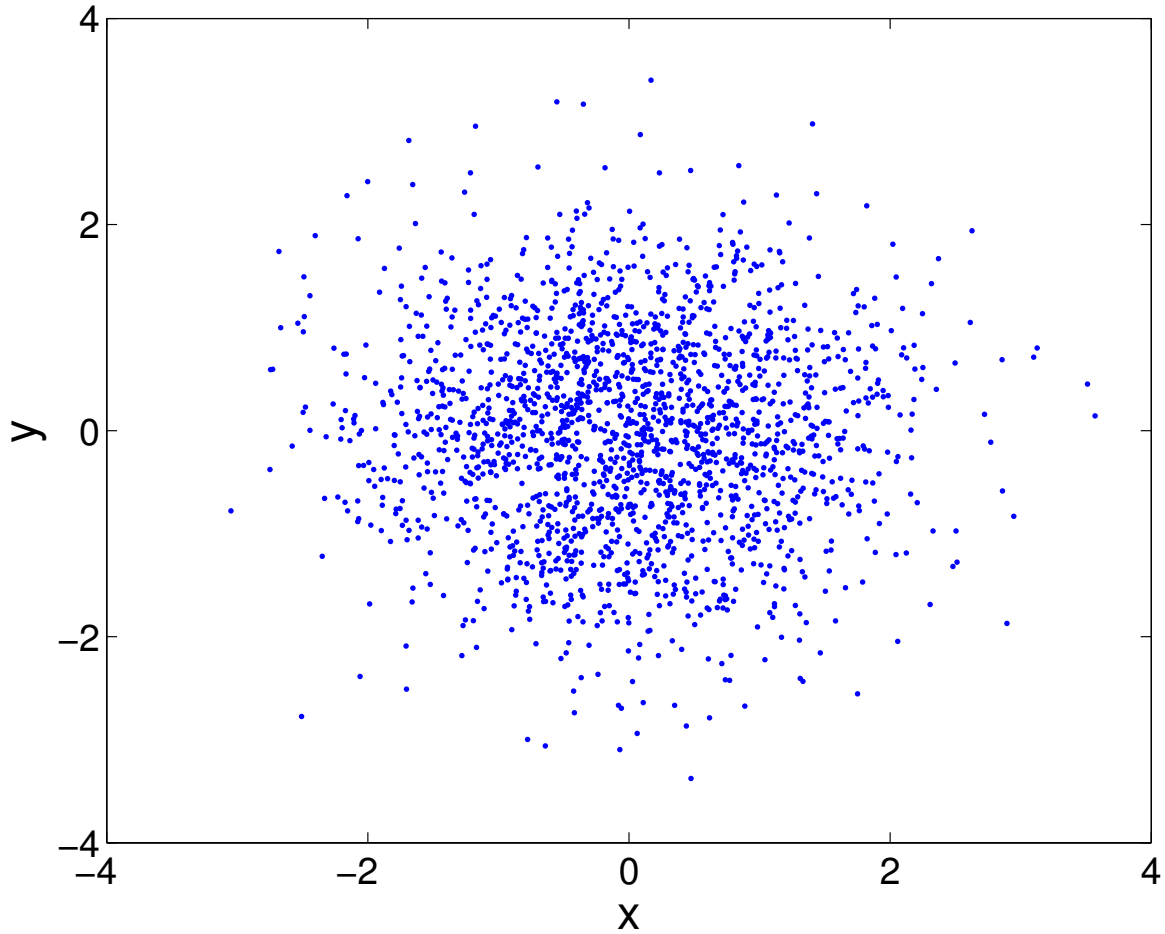
Learning objectives

After today's lecture you should be able to

- Describe what an **autocorrelation function** (ACF) is (definition and interpretation).
- Explain why the Fourier transform of the ACF is called the **power spectral density** (PSD)
- Summarize what **AR, MA and ARMA processes** are.

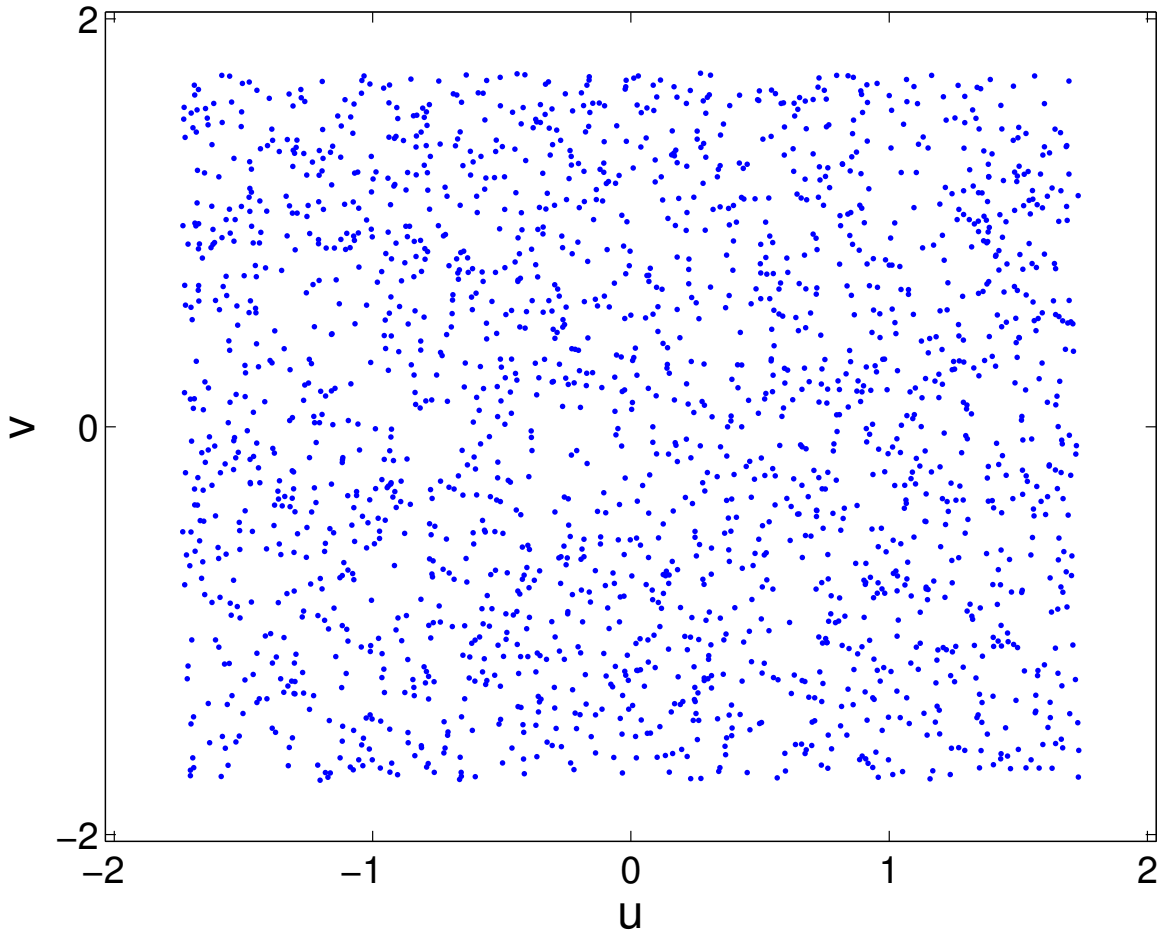
Autocorrelations

- What is $\mathrm{E}\left(x^2\right)$, $\mathrm{E}\left(y^2\right)$ and $\mathrm{E}\left(x\,y\right)$?



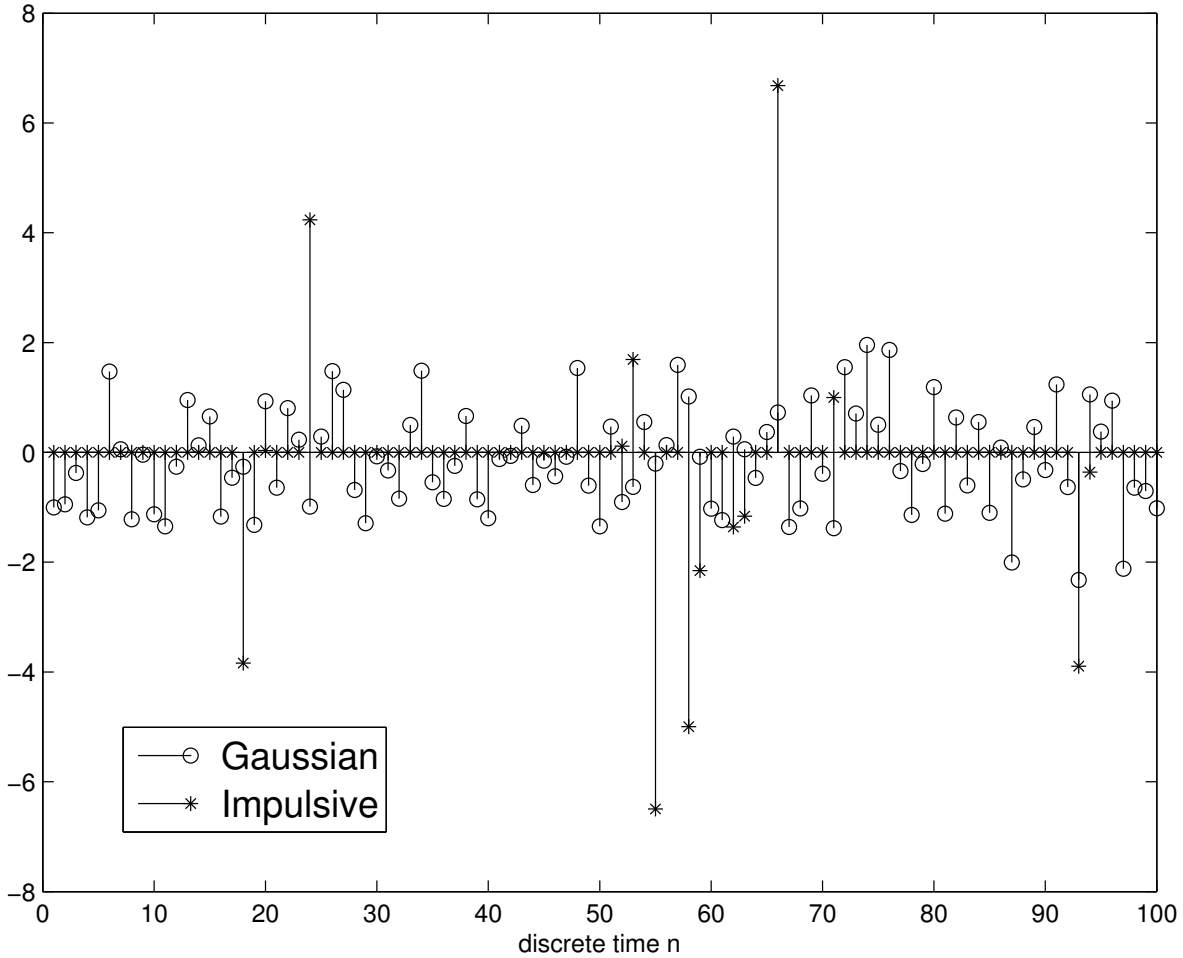
Autocorrelations

- What is $\mathrm{E}\left(v^2\right)$, $\mathrm{E}\left(u^2\right)$ and $\mathrm{E}\left(u\,v\right)$?



Autocorrelations

- What is $r_x[0]$ for the two processes?



Autocorrelations

- What is $\mathrm{E}\left(x^2\right)$, $\mathrm{E}\left(z^2\right)$ and $\mathrm{E}\left(x\,z\right)$?