Read Noise Modelling of Skipper CCDs

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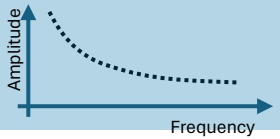
Image Sensors for Precision Astronomy – March 12-14, 2024

Source-Follower Noise Spectrum

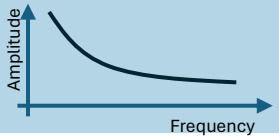
Discrete Spectrum

- Real data from Transistor
- Computationally intensive



Continuous Spectrum

- simple model: white noise, 1/f, 1/f²



Readout Waveform Transfer Function

Time-domain definition

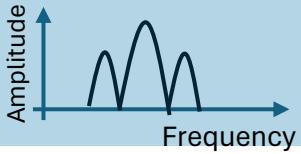
- Arbitrary waveform

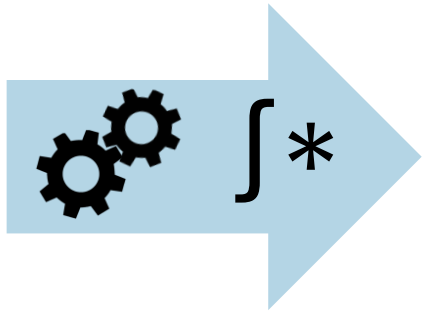
FFT

Discrete Spectrum

Analytical definition

- Only a sub-set of simplified waveforms: CDS, CDS with inter-pedestal delay, Skipper.





Integrated Noise

- Result in e^-
- Good match with lab measurement in case of CDS with an STA CCD.
- Skipper analysis shows expected decrease as √samples.

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