

$$\Sigma \quad \frac{1}{N} \sum_{n=1}^N \text{conv}(f, f) * \left( \begin{matrix} \cos(2\pi s_{\max} q) \\ \downarrow \end{matrix} \right) q = \left( \begin{matrix} \leftarrow \rightarrow \\ \leftarrow \rightarrow \end{matrix} \right)$$

Observe:  $Y_n$   $(Y_n - \mu)^2$

$$\hat{\text{Var}}(Y_n) = \frac{1}{N} \sum (Y_n - \hat{\mu})^2$$

$$Y_n = \sum_t \sum_r f_n(t) f_n(r) \cos(2\pi s(r-s)) \quad \text{parstuv}$$

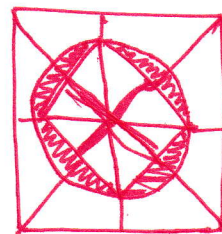
$$\Rightarrow Y_n - \mu = \sum_t \sum_r (f_n(t) f_n(r) - \mathbb{E}[f_n(t) f_n(r)]) \cos(\leftarrow \rightarrow)$$

$$\Rightarrow (Y_n - \mu)^2 = \sum_{r, t, u, v} (f_n(t) f_n(r) - \mathbb{E}[f_n(t) f_n(r)]) (f_n(u) f_n(v) - \mathbb{E}[f_n(u) f_n(v)]) \cos(\leftarrow \rightarrow) \cos(\leftarrow \rightarrow)$$

$$\mathbb{E}[Y_n^2] = \mathbb{E}[Y_n(Y_n - \mu)]$$

$$= \sum_{r, t, u, v} \underbrace{\mathbb{E}[\left( \begin{matrix} \leftarrow \rightarrow \end{matrix} \right)]}_{= \text{Var}(f_n(t) f_n(r))} \cos s \cos$$

$$= \text{cov}(f_n(t) f_n(r), f_n(u) f_n(v))$$



$$= \frac{1}{N} \sum_n \left( \sum_{t,r} (Y_n - \hat{\mu}) \right) \left( \sum_{u,v} Y_n \right)$$

$$Y_n = \sum_{r,t}$$