target M template time series TFA 19/02/09.0

$$F(i) = \sum_{j=1}^{M} c_j X_j(i).$$

$i=1, N$ is the flux timeseries.

the coefficients are found by minimizing

$$D = \sum_{i=1}^{N} \left[Y(i) - A(i) - F(i) \right]^2,$$

where $Y(i)$ is the target time series (flux vs time for target star) ...

and for frequency analysis,

$$A(i) = \langle Y \rangle = \frac{1}{N} \sum_{k=1}^{N} Y(k) = \text{const.}$$

19/02/18.

DETAILS OF KERNEL

$$D_{xy} = I_{xy} - M_{xy}$$

$$M_{xy} = (R \otimes K)_{xy} + B_{xy}, \quad \text{s.t.}$$

$$\min(\chi^2) = \min\left(\sum_{xy} \left(\frac{I_{xy} - M_{xy}}{\sigma_{xy}} \right)^2 \right)$$

for $K = \sum_i a_i K_i$ ← basis functions.

a_i ← coefficients we're optimizing.

- Background, identity, & delta-function (discrete) basis components...

$$\boxed{K \Leftrightarrow K_{xy, lm}}$$

$$M_{xy} = \mathbb{I}_{xy} + B_{xy} + (R \otimes K)_{xy}$$

$\mathbb{I}_{xy}$ ← identity, not image

$$= \underbrace{\sum_{lm} x^l y^m I_{xy} K_{00,lm}}_{\text{"identity term"}} + \underbrace{\sum_{lm} x^l y^m b_{lm}}_{\text{"background term"}}$$

$K_{00,lm}$ ← kernel coeffs for identity

"background term" (an obviously bad model...)

$$+ \underbrace{\sum_{lm} \sum_{x',y'=-k}^{x'y'=k} K_{x'y',lm} \, x^l y^m \left(\frac{I_{x+x', y+y'} - I_{xy}}{2} \right)}_{\text{"discrete pixel terms"}}$$

"discrete ~~[illegible]~~ pixel terms"

for k the kernel size.