# NOTES ON THE ADDITION OF A CROSSTALK PARAMETER

Crosstalk is the contribution of the signal from flows other than the inverted one. The parameter, $\nu$, controls the amount of crosstalk. Only the subtractive optimally localized averaging (SOLA) inversions for local helioseismology use this parameter, and only for 3D-vector cases. The RLS inversions do not use the crosstalk parameter.

## 1. SOLA with Crosstalk

A SOLA inversion minimizes the cost function $X$. The cost function comes from Jackiewicz et al. [2012] with the addition of a crosstalk term from Švanda et al. [2011].

$$X(\mu,\nu) = \int_{\odot} d^3x[\mathcal{K}^{\alpha}_{\alpha}(x;z_0) - \mathcal{T}(x;z_0)]^2 + \nu \sum_{\beta\neq\alpha} \int_{\odot} d^3x[\mathcal{K}^{\alpha}_{\beta}(x;z_0)]^2 + \mu \sum_{i,j,a,b} w_a(r_i;z_0)\Lambda_{ab}(r_i-r_j)w_b(r_j;z_0)$$

where, $a$ is a particular measurement (travel-time map), and $\alpha$ and $\beta$ are scatterers such as flow velocities. The crosstalk parameter is $\nu$, and the noise parameter is $\mu$. The first term is the misfit, the second term is the crosstalk, and the last term is the error. The misfit is a measure of how the averaging kernel fits a pre-defined target function, $\mathcal{T}$. A SOLA inversion produces the weights, $w$, which minimize the cost function, $X$.

## 2. Removing $w(k=0)=0$)

Removing the $k_x, k_y = 0$ pixels from the weights removes the shift observed in SOLA inversions.

## References


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M. Švanda, L. Gizon, S. M. Hanasoge, and S. D. Ustyugov. Validated helioseismic inversions for 3D vector flows. *Astronomy & Astrophysics*, 530:A148, June 2011. doi: 10.1051/0004-6361/201016426.


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