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| **Table S1 List of symbols and variables.** |
| **Parameter or symbol** | **Description** |
| $$X$$ | Sequence of turbulent images |
| $$n$$ | Number of images |
| $$d$$ | Dimension of each turbulent image |
| $$U$$ | Basis matrix |
| $$V$$ | Coefficient matrix |
| $$u\_{i}$$ | $i^{th} $ row vector of *U* |
| $$v\_{j}$$ | $j^{th}$ row vector of *V* |
| $$ε\_{ij}$$ | Image noise per $j^{th}$ pixel of the $i^{th}$ turbulent image |
| $$N \left(0, σ\_{k}^{2}\right)$$ | Gaussian distribution with zero mean and $σ^{2}$ variance |
| $$W$$ | Matrix of non-negative weights |
| $$Y$$ | Turbulence-free images |
| $$diag\left(w\_{i}\right)$$ | Diagonal matrix with elements $w\_{i}$ |
| $$I$$ | Identity matrix |
| $$τ$$ | Transformation matrix |
| $$∘$$ | Transformation operator |
| $$J\_{i}$$ | Jacobian matrix of $i^{th}$ image |
| $$S\_{\frac{1}{μ}}$$ | Soft thresholding operator |
| $$ρ$$ | Penalty value in ADMM algorithm |
| *P* | Step of the ADMM algorithm |
| $$W\_{min}$$ | Minimum allowable size of window |
| $$W\_{max}$$ | Maximum allowable size of window |