HyperCSI (Hyperplane-based Craig-Simplex-Identification) Algorithm

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Unlike many hyperspectral unmixing algorithms, the HyperCSI algorithm not only estimates the *endmember* matrix $\mathbf{A}$ from a given dataset $\mathbf{X} = \mathbf{AS}$, but also estimates the associated abundance matrix $\mathbf{S}$. The estimation process (for both endmembers and abundances) can be done within tenths of a second, on typical desktop computer, even when the data length $L > 10,000$. Furthermore, the HyperCSI algorithm does not rely on the *pure pixel assumption*. Therefore, for those algorithms that need an initialization of $\mathbf{A}$ and/or $\mathbf{S}$, the outputs of the HyperCSI algorithm also serve as good and fast initialization for these algorithms.

To help readers access smoothly the HyperCSI algorithm, we release its source code, together with a demo for the HyperCSI algorithm based on the experimental setting in Section V of the main reference [1]. Any questions and suggestions are very welcome.

References

[1] C.-H. Lin, C.-Y. Chi, Y.-H. Wang, and T.-H. Chan, "A fast hyperplane-based minimum-volume enclosing simplex algorithm for blind hyperspectral unmixing," *IEEE Trans. Signal Processing*, vol. 64, no. 8, pp. 1946–1961, April 2016.

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