**Intrinsic Dimensionality code from the SHIFT campaign**

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The SBG High-Frequency Time Series (SHIFT) campaign was conducted by the NASA Jet Propulsion Laboratory (JPL), along with The Nature Conservancy’s Point Conception Institute and the University of California at Santa Barbara (UCSB) (Brodrick et al., 2023; Chadwick et al, in review). This campaign included airborne and field data that were collected to understand how rapidly this diverse ecosystem changes within a season.

SHIFT was used as a proxy for code development for the BioSCape campaign. Included in this repository is python code for computing Intrinsic Dimensionality (ID) using Random Matrix Theory (Cawse-Nicholson et al., 2013), as well as a noise estimate and ID output for the SHIFT region of interest. The RMT.py code can be called as:

K = RMT(img, noise)

Where img is a spectroscopy image in the format rows x columns x bands, and noise is a covariance matrix of size bands x bands. A sample noise covariance is provided here (SHIFT\_estnoise\_output.mat), which represents AVIRIS-NG bands, with bands that may contain high levels of noise or atmospheric features removed (we used bands in the wavelength ranges (405 nm, 1340 nm), (1460 nm, 1800 nm), and (2050nm, 2450 nm)). The img file must represent the same bands as those used in the noise estimation.

Also provided in this repository is the code used to generate the SHIFT ID across a 1 km spatial grid, for each date of the SHIFT campaign (RMT\_validation\_final.ipynb). This is provided in the interests of open science and is not intended to be used “plug-and-play”. Its intended use was to read the SHIFT data on the SMCE cloud environment. The output is fully described in the manuscript currently under development (Cawse-Nicholson et al., 2024).

**References**

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