

Plotting the Complex Mode Indicator Function with Colors Indicating the Strongest Excitation

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ABSTRACT

The Complex Mode Indicator Function (CMIF) is a very robust tool introduced in the late 80's to identify multiple complex or real normal modes with closely spaced natural frequencies in multi-reference data sets. It is calculated by a Singular Value Decomposition of the 3D Frequency Response Function (FRF) matrix at each frequency line. Typically the output is a plot of the 'sorted' singular values of the FRF matrix as a function of frequency. The right hand singular vectors show the relative amplitude at which each force input excites the left singular vectors. By assigning a color for each reference and associating each singular value with its corresponding largest value from the right singular vector, a colored CMIF plot can be generated which shows the best force input for each mode. With multiple reference input testing, the resonant frequencies can often be inconsistent between FRFs collected from different references. This can confuse a multi-reference parameter extraction algorithm causing multiple roots to be extracted for a single mode. The new colored CMIF can be utilized with the single input multiple output FRF set to most easily extract a particular mode from a closely spaced group of modes.

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