See Also

Matrix Math Operations on page III-138 for more about Igor's matrix routines.

MatrixSVD

MatrixSVD [***flags***] ***matrixWave***

The MatrixSVD operation uses the singular value decomposition algorithm to decompose an MxN matrixWave into a product of three matrices. The default decomposition is into MxM wave M_U, min(M,N) wave W_W and NxN wave M_VT.

Flags

/B — Use this flag for backwards compatibility with Igor Pro 3. This option applies only to real valued input waves. Note that no other flag can be combined with /B. Here the decomposition is such that:

U*W*V^T = *matrixWave*

- U: MxN column-orthonormal matrix.
- W: NxN diagonal matrix of positive singular values.
- V: NxN orthonormal matrix.

/DACA — Replaces the standard LAPACK algorithm with one that is based on a divide and conquer approach. For a typical 1000x1000 matrix this provides a 6x speed improvement.

Added in Igor Pro 7.00.

/INVW — Saves the inverse of the elements in W_W. The results are then stored in wave W_InvW.

/O — Overwrites *matrixWave* with the first columns of U. Use this flag to if you need to conserve memory. See also related settings of /U and /V.

/PART =*nVals* — Performs a partial SVD computing only *nVals* singular values (stored in W_W) and the associated vectors in the matrix M_U and M_V. If you use this flag the operation ignores all other flags except /PDEL. The partial SVD is computed using the Power method of Nash and Shlien.

The /PART flag was added in Igor Pro 7.00.

/PDEL=*del* — Sets the convergence threshold which defaults to 1e-6. Larger positive values result in faster execution but may lead to less accurate results.

The /PDEL flag was added in Igor Pro 7.00.

/U =*UMatrixOptions* — *UMatrixOptions* can have the following values:

- 0: All columns of U are returned in the wave M_U (default).
- 1: The first min(m,n) columns of U are returned in the wave M_U.
- 2: The first min(m,n) columns of U overwrite matrixWave (/O must be specified).
- 3: No columns of U are computed.

/V=*VMatrixOptions* — *VMatrixOptions* can have the following values:

- 0: All rows of V^T are returned in the wave M_VT (default).
- 1: The first min(m,n) rows of V^T are returned in the wave M_VT.
- 2: The first min(m,n) rows of V^T are overwritten on *matrixWave* (/O must be specified)
- 3: No rows of V^T are computed.

/Z — No error reporting.