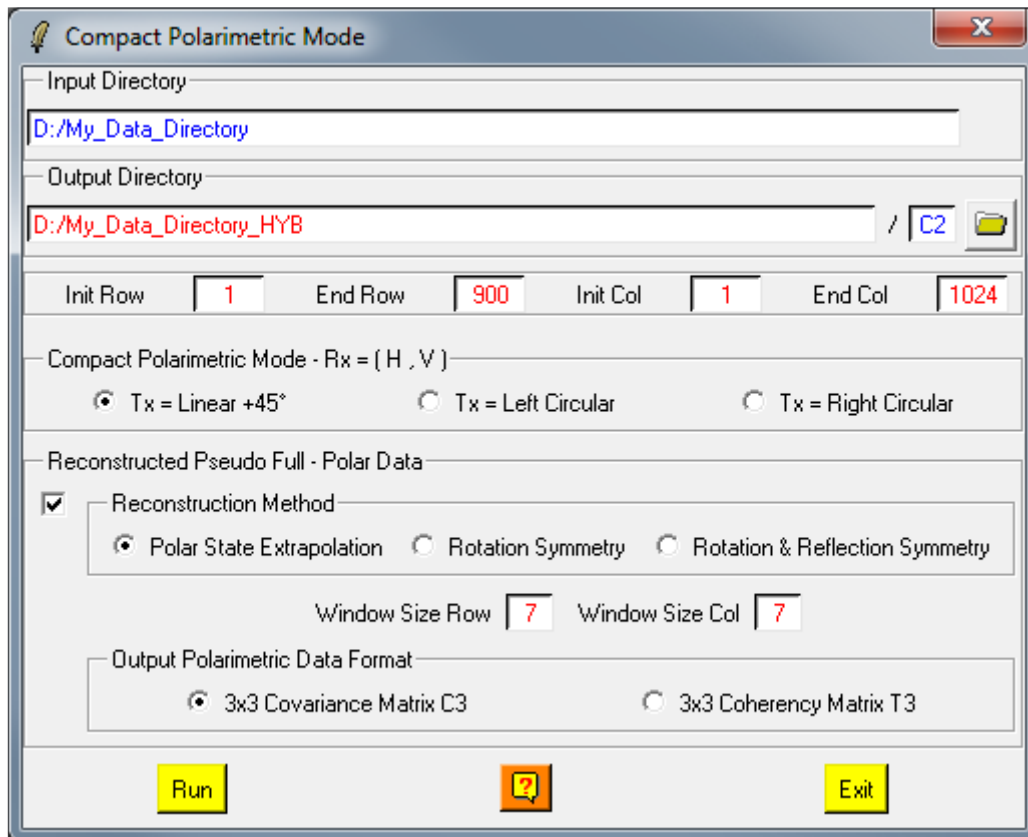


Compact Polarimetric Mode



Description:

Recent interest in dual-pol SAR system has lead to a novel approach to dual-pol SAR, the so-called **Compact Polarimetric Mode**. (see [Compact Polarimetry Based on Symmetry Properties of Geophysical Media: The \$\pi/4\$ Mode](#), J.C. Souyris, P. Imbo, R. Fjortoft, S. Mingot, J.S. Lee, *IEEE TGRS*, Volume 43, No 3, pp 634 – 646, March 2005). This new technique shows the promise of being able to reduce the complexity, cost, mass and data rate of a SAR system while maintaining capabilities of a fully polarimetric system.

This function offers the possibility to perform a Compact Polarimetric Mode from (2x2) complex Sinclair monostatic [**S2**] matrix polarimetric data sets.

Such compact dual-pol polarimetric SAR system collects scattering vectors by transmitting a given polarized signal and the coherently receiving any pair of orthogonal polarization basis.

These corresponding scattering vectors are thus constructed by the way of Special Unitary operators from SU(2) and the results are saved in a (2x2) Covariance matrix ([**C2**]) raw binary data format.

This function also allows construction of pseudo quad-pol information from the generated dual polarization raw binary files, and save the results either in a (3x3)

Covariance matrix ([C3]) or in a (3x3) Coherency matrix ([T3]) format raw binary data format

Important Note: This program assumes that the input (2x2) complex Sinclair monostatic [S2] matrices are defined in the (H,V) basis.

Comments:

Parameters written in Red can be modified directly by the user from the keyboard.

Input/Output Arguments:

Input Directory	Indicates the location of the considered Main Directory (MD) containing the polarimetric data sets to be filtered.
Output Directories	<p>Indicates the location of the data output directory. The default value is set automatically to Main Directory_HYB / C2.</p> <p>If the Pseudo Quad-Pol Data Reconstruction is selected, a second data output directory is created and the default value is set automatically to:</p> <ul style="list-style-type: none">• Main Directory_HYB / C3 if the (3x3) Covariance matrix ([C3]) output data format is selected.• Main Directory_HYB / T3 if the (3x3) Coherency matrix ([T3]) output data format is selected.

Output Image Number of Rows/Columns:

The output image numbers of rows and columns are initialised to the input data set dimensions.

Users wishing to process a sub-part of the initial image can modify the **Init** and **End** values of the converted images rows and columns.

Note: init and end values have to remain within the range defined by the input image dimensions.

Processing Parameters:

Compact Polarimetric Mode	<p>Users have to select the Transmit (Tx) polarisation state. The Receipt Polarisation basis (Rx) is fixed to the (H,V) basis.</p> <ul style="list-style-type: none">• PI/4 Mode: +45° - (H , V)• Left Circular Mode : LC - (H , V)• Right Circular Mode : RC - (H , V)
Window size	<p>Users have to set the size of the (N*N) sliding window used to compute the local estimate of the average matrix.</p> <p>The default value of N is set to 7.</p>
Reconstructed Pseudo Full-Polar Data	<p>If selected, users have to choose :</p> <p>The reconstruction method:</p> <ul style="list-style-type: none">• using <i>Polarisation State Extrapolation</i>• using <i>Rotation Symmetry</i>• using <i>Rotation and Reflection Symmetry</i> <p>The full polarimetric output data format:</p>

- (3x3) Covariance matrix (**[C3]**)
 - (3x3) Coherency matrix (**[T3]**)
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