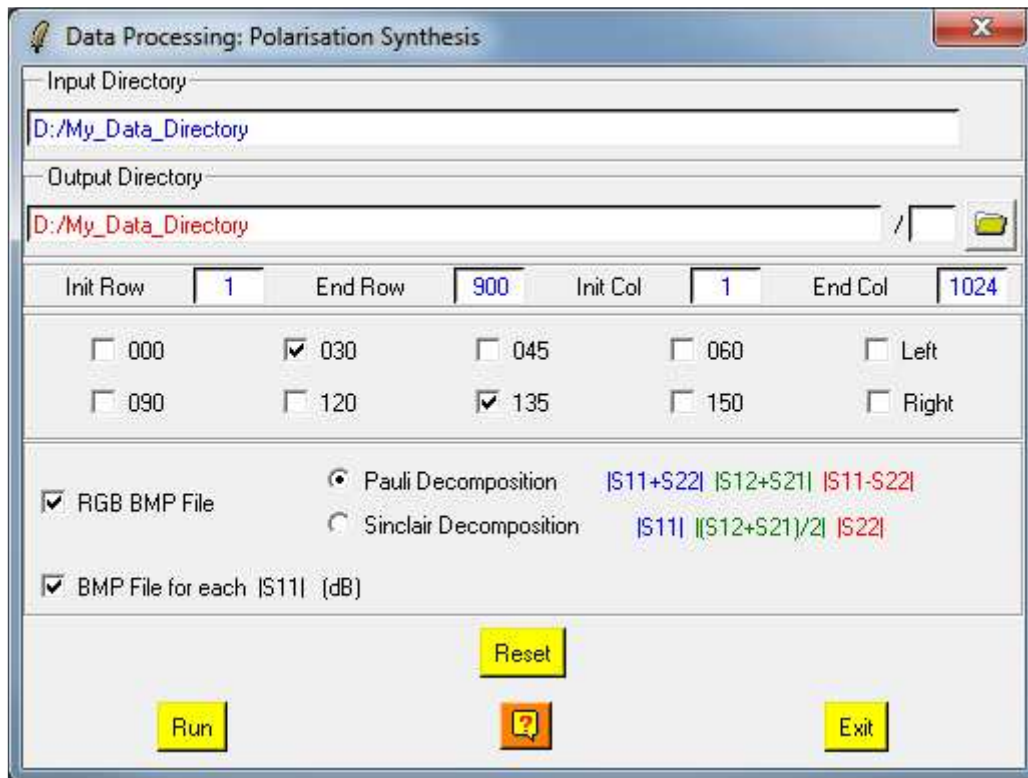# Polarisation Synthesis



## Description:

This function offers the possibility to create color coded 24 bits bitmap image files of a polarimetric data set represented in different elliptical polarization basis. The change of basis is performed by the way of Special Unitary operators from SU(2), SU(3).

The collection of these different BMP images can be useful when showing the variation of the polarimetric signatures of natural / artificial media versus the elliptical polarisation basis used.

**Important Note**: This program assumes that the input polarimtric data sets are defined in the **(H,V)** basis. Users wishing to transform data sets defined in another polarization have to take this fact into account.

## 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 Directory** | Indicates the location of the data output directory. The default value is set automatically to : **Main Directory (MD)**. |

## 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:

| | |
|---|---|
| **000, 030, 045, 060, 090, 120, 135, 150** | Correspond to different Linear polarisation basis defined by the value of the ellipse orientation angle of the new elliptical polarisation basis. In the Linear Basis Change case, the ellipse orientation angle belongs to the range [-90°, +90°], and the ellipicity angle is set to 0°. |
| **Left, Right** | Correspond to the two Circular polarisation basis. In the Circular Basis Change case, the ellipse orientation angle is set to 0°, and the ellipicity angle is set either to +45° (Left) or to -45° (Right). |
| **RGB BMP file** | If selected, a 24-bit colour BMP image (Windows Bitmap format) containing contrasted red, green and blue channels assigned to the different polarimetric binary raw data files and combinations is created for each polarisation basis selected. The corresponding output files, according to the polarisation basis selected, are: |

- MD / synt000_pauli.bmp
- MD / synt030_pauli.bmp
- MD / synt045_pauli.bmp
- MD / synt060_pauli.bmp
- MD / synt090_pauli.bmp
- MD / synt120_pauli.bmp
- MD / synt135_pauli.bmp
- MD / synt150_pauli.bmp
- MD / syntleft_pauli.bmp
- MD / syntright_pauli.bmp

| | |
|---|---|
| **BMP file for each |s11| (dB)** | If selected, a 8-bit dynamic range (Windows Bitmap format) image file of the parameter |s11|, extracted from the polarimetric raw binary data files, is created for each polarisation basis selected. The corresponding output files, according to the polarisation basis |

selected, are:

- MD / synt000_db.bmp
- MD / synt030_db.bmp
- MD / synt045_db.bmp
- MD / synt060_db.bmp
- MD / synt090_db.bmp
- MD / synt120_db.bmp
- MD / synt135_db.bmp
- MD / synt150_db.bmp
- MD / syntleft_db.bmp
- MD / syntright_db.bmp