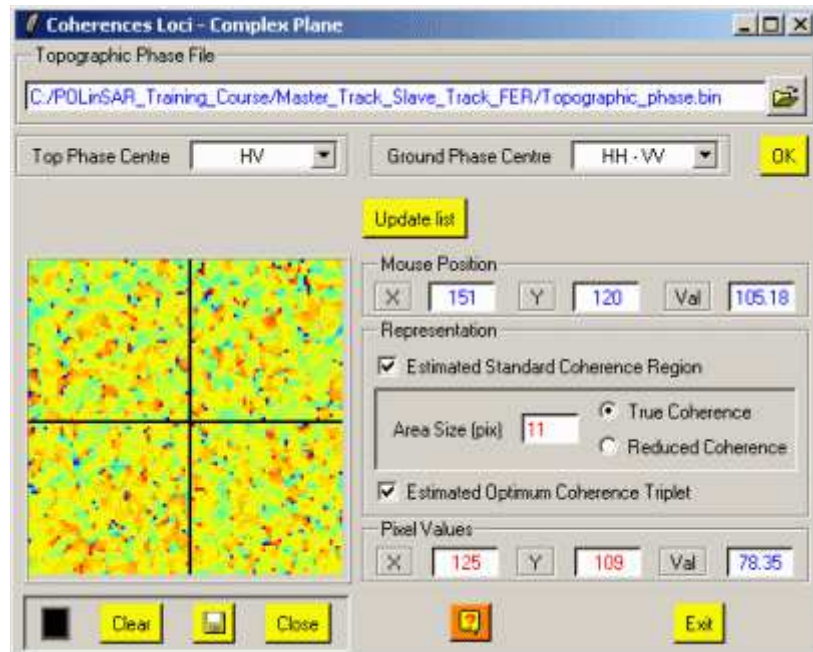# Coherences Loci – Complex Plane

Description:

This Application is used to display the boundary of the coherence region (both phase and amplitude) inside the unit circle in the complex plane, for all polarisation vectors. (see POLinSAR Training Course)

The selection of points of interest and the results displayed is achieved by the way of an interactive Graphical User Interface.

Comments:

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

Topographic Phase File:

Enter the complete full path of the input Topographic Phase file name

Top and Ground Phase Centres:

Once launched, this functionality automatically checks the existence, in the considered input directory, of the following complex coherence data files:

- cmplx_coh_HH.bin, cmplx_coh_HV.bin, cmplx_coh_VV.bin : corresponding to the **Linear** representation of the considered complex coherences.
- cmplx_coh_LL.bin, cmplx_coh_LR.bin, cmplx_coh_RR.bin : Corresponding to the **Circular** representation of the considered complex

coherences.

- cmplx_coh_HHpVV.bin, cmplx_coh_HHmVV.bin, cmplx_coh_HVpVH.bin : Corresponding to the **Pauli** representation of the considered complex coherences
- cmplx_coh_Opt1.bin, cmplx_coh_Opt2.bin, cmplx_coh_Opt3.bin : Corresponding to the **Optimal** polarization state representation of the considered complex coherences.

Users have then to select the two polarisation channels corresponding to the Top Phase Centre and to the Ground Phase Centre,

Update List

Users can select different polarimetric channels in the different combo boxes (*Polarimetric Channel, Top Phase Centre, Ground Phase Centre*) among a proposed list. The elements of these different lists correspond to the generated complex coherence files. If some polarisation channels are missing, they have to be generated using the **Complex Coherence Estimation** functionality. In this case, it is important to click on the button Update List in order to update the different polarisation channel lists.

Mouse Position:

X, Y   Give the Mouse pointer position in pixels. The Top-Left position corresponds to the (1,1) value and the Bottom-Right position corresponds to the (Nrows, Ncols) value.

Value   Display the pixel value (Note: this functionality is only valid if the active image is an 8-bits Windows Bitmap image).

Representation:

Select pixel and display both phase and amplitude of the following complex coherences inside the unit circle in the complex plane
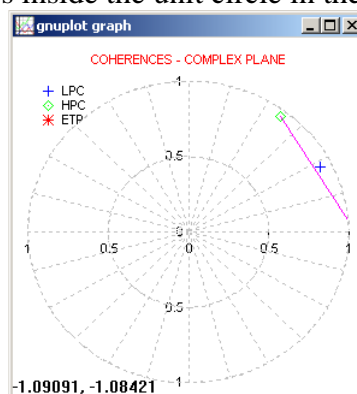

LPC stands for Low Phase Centre
HPC stands for High Phase Centre
**ETP** stands for Estimated Topographic Phase
These three elements are used for the height estimation (see POLinSAR Training Course).

Estimated Standard Coherence Region

Select pixel and his neighbourhood and display both phase and amplitude of the corresponding boundary of the coherence region inside a unit circle in the complex plane
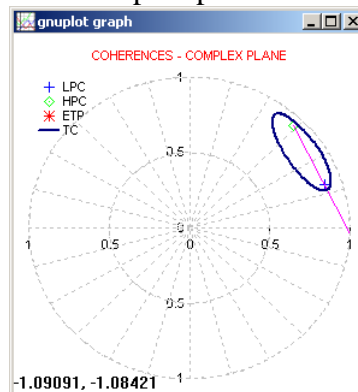

TC stands for True Coherences
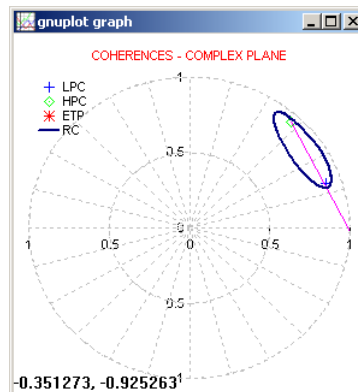
RC stands for Reduced Coherences

Area Size

Number of **pixels** used to define the size of the (NxN) window, centred around the selected pixel and that is used to estimate its characteristics metrics.

Estimated Optimum Coherence Triplet

Select pixel and display both phase and amplitude of the optimal complex coherences inside the unit circle in the complex plane
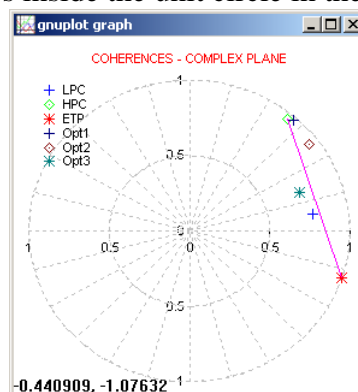
Opt1 stands for Optimal Complex Coherences n°1
Opt2 stands for Optimal Complex Coherences n°2
Opt3 stands for Optimal Complex Coherences n°3

Graphic Editor:

          Toggle selected line contour color (black / white).

Clear   Clear the Display Window.

          Save the active Display Window .

Close   Close the Display Window

Coherences Loci – Complex Plane Procedure Steps:

- **1** : Enter the input Topographic Phase file
- **2** : Select the two Complex Coherences channels corresponding to the Top Phase Centre and to the Ground Phase Centre
- **3** : Click on the **OK** button to validate the configuration
- **4** : Select the Representation Display Format : Coherence Region and / or Optimum Triplet and enter the Area Size in pixels if necessary.
- **5** : Point on the Pixel using the Mouse and the Cross Lines.
- **6** : Select the Pixel by clicking on the left Mouse button.
- **7** : To proceed with another point / area go to step **1** or **2**