NAME

cloude − Cloude/Pottier decomposition of comlex polarimetric radar signal

SYNOPSIS

cloude [**−2**] [**−a** | **−c**] [**−n**] [**−r**] < inseq > outseq

DESCRIPTION

For each input pixel in a multilook, comlex, polarimetric radar signal *cloude* finds the eigenvalues, coefficients of the characteristic polynomium also known as the principal invariants (such as the trace and the determinant), and polarimetric entropy and energy of the covariance data matrix formed as the outer product of the complex vector [Shh √2Shv Svv]^T. Input is [Shh Shv Svv]^T in three complex frames. If **−2** is specified *cloude* does not multiply Shv by √2. The covariance matrix

ShhShh*	√2 ShhShv*	ShhSvv*
√2 ShvShh*	2 ShvShv*	√2 ShvSvv*
SvvShh*	√2 SvvShv*	SvvSvv*

is Hermitian. Alternatively, input can be either nine float frames (ShhShh*, Re{ShhShv*}, Im{ShhShv*}, Re{ShhSvv*}, Im{ShhSvv*}, ShvShv*, Re{ShvSvv*}, Im{ShvSvv*}, SvvSvv*) or if we assume azimuth symmetric targets five float frames (ShhShh*, Re{ShhSvv*}, Im{ShhSvv*}, ShvShv*, SvvSvv*). In the azimuth symmetric target case ShhShv*, ShvSvv* and of course their complex conjugates are assumed to be 0. Alternatively, by specifying **−c** *cloude* works on the coherency data matrix. This matrix is the outer product of the complex vector 1/√2 [Shh+Svv Shh−Svv 2Shv]^T.

Input must be band-interleaved by line (BIL), output is BIL. Output consists of eight or ten float frames with three eigenvalues, three coefficients of the characteristic polynomium (first coefficient is the trace (equals sum of eigenvalues), and the third is the determinant (equals product of eigenvalues)), and polarimetric entropy (log base 3) and energy of the covariance data or coherency data matrix. If **−r** is specified the correlation between Svv and Shh, and the phase difference between them are output as the last frames.

OPTIONS

−2 do not multiply Shv by √2 (this is always the case for coherency data specified with **−c**)

−a assume azimuth symmetric target (not needed if input is five float frames)

−c work on coherency data matrix rather than covariance data matrix

−n do not calculate eigenvectors (so far this is default)

−r output correlation between Svv and Shh, and the phase difference between them

SEE ALSO

bil(1)

CREDIT

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