IDL package pack\_MMS\_cocurldiv

P. Robert, December 7, 2015

Revised January 25, 2016

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The package include :

1. 1) two main crib sheets :

- crib\_MAIN\_mms\_curlometer\_tplot.pro

- crib\_MAIN\_mms\_curlometer\_crefiles.pro

* 1. crib\_MAIN\_mms\_curlometer\_tplot.pro allow to :

- load magnetic field and position, time aligned, at the 4 vertice of the MMS tetrahedron

- compute following quantities : Dij, J\_cur, Div, Div\_Curl, JxB\_Norm, JB\_Angle

- plots the results via tplot variables. An example is given figure 1.

* 1. crib\_MAIN\_mms\_curlometer\_crefiles.pro allow to:

- load magnetic field and position, time aligned, at the 4 vertice of the MMS tetrahedron

- create 4 ascii files containing header and data with the 'addvecpos\_N.resu' compatible with the Roproc software. Allow the comparison between the results of the cocurldiv sofware (in IDL) and the Roproc software (in F90).

1. 2) a series of 'sub' crib:

The main crib sheets needs some 'include' crib given below:

crib\_check\_data\_alignment.pro

crib\_check\_data\_size.pro

crib\_compile\_mms\_curlometer\_crefiles.pro

crib\_compile\_mms\_curlometer\_tplot.pro

crib\_mag\_and\_pos\_time\_alignment.pro

crib\_make\_arrays\_for\_curlometer.pro

crib\_tplot\_option\_for\_curlometer.pro

$namepack

1. 3) a series of operating procedures:

To run, theses crib also requires the following IDL procedures:

cocurldiv.pro

cointdist.pro

create\_magpos\_file.pro

cangrat.pro

datim\_iso.pro

mms\_init.pro

barycentric\_lib.pro

1. 4) some 'time' procedures for ISO date management:

tu\_datesec.pro

tu\_julsec\_to\_isodatea.pro

tu\_julsec\_to\_isodate.pro

tu\_secdate.pro

tu\_secday\_to\_strtime.pro

1. 5) directories provide
   1. a) Tdas software:

general.tar.gz

spdsw\_r19402\_2015-11-17.tar.gz

DATA\_MMS.tar.gz

Note that line 107 of the the mms\_init.pro located in

./spdsw\_r19402\_2015-11-17/idl/projects/mms/common/mms\_init.pro

has been commented to avoid a 'splash' message.

* 1. b) Results of crib\_MAIN\_mms\_curlometer\_tplot.pro

results.tar.gz

This directory contains PS and PNG files.

* 1. c) Results of Roproc cocurldiv procedure

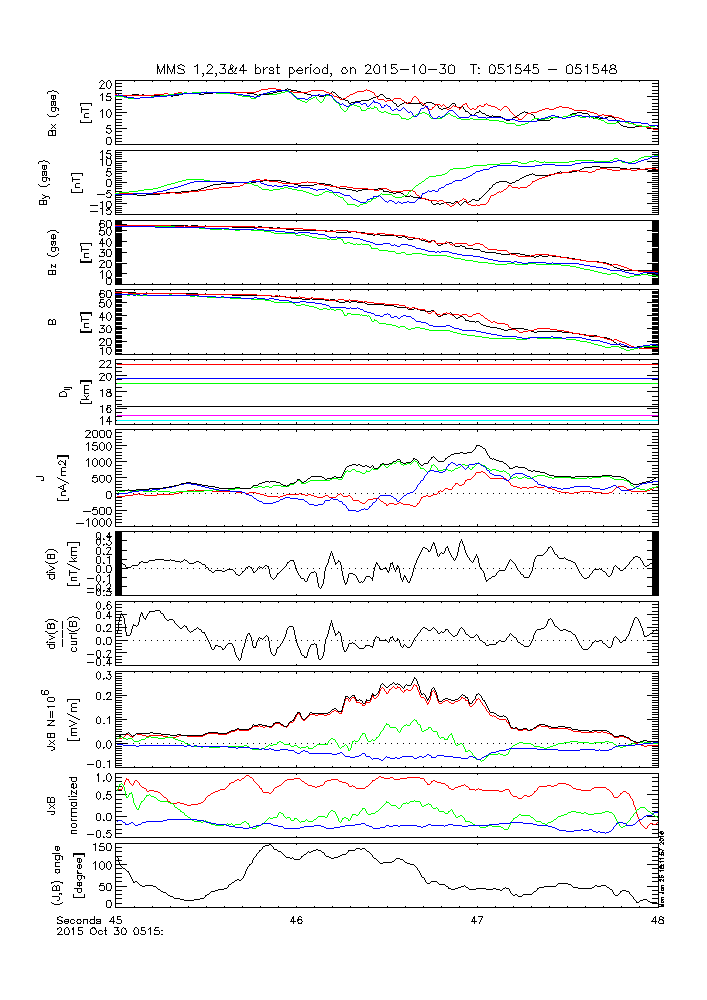
test\_Roproc.tar.gz

This directory contains files addvecpos\_N.resu ( N=1, 2, 3, 4) created by crib\_MAIN\_mms\_curlometer\_crefiles.pro, and the curlometer computation made by the Roproc sofware. Usefull to test the validity of the IDL package. Tests have benn done and are successful.

6) Revision of January 2016

A calibrated tplot variable JXB, in mV/m, has been added. For this computation, a density of N=1.6 electron/m3 has been assumed.

Current density J is now in nA/m2.



**Figure 1: plot example provided by 'crib\_MAIN\_mms\_curlometer\_tplot.pro'**