Nobeyama Radio Polarimeter (NoRP)
Analysis Manual
ver. 0.3

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1 Introduction

This is a manual for analysis of the data obtained by Nobeyama Radio Polarimeter (NoRP; Nakajima et al. 1985) and Toyokawa Radio Polarimeter (TYKW; Torii et al. 1979; Shibasaki et al. 1979).

For any questions and requests, please send an e-mail to
`nsro-service@solar.nro.nao.ac.jp`

The latest information on NoRP is updated on NSRO Web site. The URL is
`http://solar.nro.nao.ac.jp/norp/`

History
version 0.0 1999.1.12 version 0.1 1999.1.13 version 0.2 1999.2.19

2 How to setup

(1) Installation of the *SolarSoftware*.

Install the SolarSoftware (SSW) with the subpackage 'Radio/NoRH'. We strongly recommend to install the SolarSoftware with the sub-package for Yohkoh/SXT and HXT. If these softwares were not installed, please contact your system manager. The primary distribution site for SolarSoftware is: `http://www.lmsal.com/solarsoft/` We define the top directory of SSW as `${SSW}` and that of NoRP subpackage as `${NORP}` (usually `${SSW}/radio/norh`) in this manual. The original version of the NoRH software is included in the distribution CD-ROM.

(2) Setup of your personal environment

Include the followings in your environment setup file (`~/.cshrc`).

```
setenv SSW SSW-directory
setenv SSW_INSTR ''norp''
source ${SSW}/gen/setup/setup.ssw
```

Note that the enviroment variable `${SSW}` can be different (Ask your system manager)[1]. In case you analyze many kinds of data at the same time, define SSW_INSTR as follows, e.g.

```
setenv SSW_INSTR ''sxt hxt norp''
```

3 Where is the Data ?

3.1 Calibrated Data in XDR (IDL save) format

Some already-calibrated NoRP data are put in the NSRO archive. You can obtain them by anonymous FTP. Before synthesizing by yourself, try them first. They are loaded into the IDL session by using the IDL command `restore`.

[1] In NSRO, it is `/sgi1/ssw`

3.2 Raw Data

Some raw NoRP data are put in the NSRO archive. You can obtain them by anonymous FTP.

4 Analysis

4.1 Start Analysis

The NoRP IDL procedures described in this section all depend on the SolarSoftware (SSW). When you start the analysis, start up the SSW/IDL as follows:

`unix%` **sswidl** <CR>

5 Read the Data — Nobeyama Radio Polarimeter

There are two kinds of formats for Nobeyama Radio Polarimeter (NoRP). One is before unifing with Toyokawa Radio Polarimeter and the other is after that. For older format, the files include only 1,2,4 9 GHz data.

In order to read the data into IDL session, give the date (JST) as follows:

`IDL>` **day='2000-4-8'**
`IDL>` **norp_rd_dat,day,mvalid,time,fi,fv,freq** <CR>

or give the file name as follows:

`IDL>` **file='pl921102'**
`IDL>` **norp_rd_dat,file,mvalid,time,fi,fv,freq** <CR>

The frequencies of the loaded data are in the array `freq`

`IDL>` **print,freq** <CR>

In order to read the data in specified duration:

`IDL>` **timerange=['1992-11-2 2:00','1992-11-2 4:00']** <CR>
`IDL>` **norp_rd_dat,file,mvalid,time,fi,fv,freq,timerange=timerange** <CR>

In order to read the data of specified frequency, e.g. for 17 GHz,

`IDL>` **rdfreq=[0,0,0,0,1,0,0]** <CR>
`IDL>` **norp_rd_dat,file,mvalid,time,fi,fv,rdfreq=rdfreq** <CR>

For 1GHz and 9GHz,

`IDL>` **rdfreq=[1,0,0,1,0,0,0]** <CR>
`IDL>` **norp_rd_dat,file,mvalid,time,fi,fv,rdfreq=rdfreq** <CR>

Each element in the array `rdfreq` corresponds to the data of one frequency among 1, 2, 3.75, 9.4, 17, and 35 GHz.

6 Read the Data — Toyokawa Radio Polarimeter

The Toyokawa Radio Polarimeter was observing in 4 frequencies, namely , 2, 4, and 9 GHz.

In order to read the data into IDL session, give the date (JST) as follows:

`IDL>` **day='2000-4-8'**
`IDL>` **tykw_rd_dat,day,mvalid,time,fi,fv,freq** <CR>

or give the file name as follows:

`IDL>` **file='ty921102.01i'** <CR> ; 1GHz I-component
`IDL>` **file0pa='ty921102.0pa'** <CR> ; 0PA calibration data
`IDL>` **filestt='ty921102.stt'** <CR> ; status data
`IDL>` **tykw_rd_dat,file,file0pa,filestt,mvalid,time,data** <CR>

In order to read the data in specified duration:

`IDL>` **timerange='1992-11-2 '+['2:00','4:00']** <CR>
`IDL>` **tykw_rd_dat,day,mvalid,time,fi,fv,freq,timerange=timerange** <CR>

In order to read the data of specified frequency, e.g. for 9 GHz,

`IDL>` **rdfreq=[0,0,0,1]** <CR>
`IDL>` **ytkw_rd_dat,file,mvalid,time,fi,fv,rdfreq=rdfreq** <CR>

For 1GHz and 9GHz,

`IDL>` **rdfreq=[1,0,0,1]** <CR>

IDL> **tykw_rd_dat,file,mvalid,time,fi,fv,rdfreq=rdfreq** <**CR**>
Each element in the array `rdfreq` corresponds to the data of one frequency among 1, 2, 3.75, and 9.4 GHz.

7 Plot

For plotting,
IDL> **mfreq=0** <**CR**>
IDL> **norp_plot,mfreq,file,mvalid,time,fi** <**CR**>
where `mfreq` is the index number of the plotting frequency in the array `freq`.
To overlay another plot
IDL> **mfreq1=0** <**CR**>
IDL> **norp_plot,mfreq1,file,mvalid,time,fi,/over** <**CR**>
Or by directly; IDL> **utplot,time(where(mvalid(mfreq,*))),fi(mfreq,where(mvalid(mfreq,*)))** <**CR**>

A NoRP data archive: anonymous FTP

The Nobeyama Solar Radio Observatory (NSRO/NAOJ) has prepared the anonymous FTP server for the NoRP data archive. The URL is

`ftp://nsro-archive.nro.nao.ac.jp/pub/norp`

If you need to transfer a large amount of data , please contact

`nsro-service@solar.nro.nao.ac.jp`
We will make and mail a CD-ROM for you. The network capability in Nobeyama is limited.

B Acknowledgement

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References

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