

Description of the subversion DAVE-DAVE4VM archive

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*** code requires a WORKING minimal SolarSoft distribution ***

*** for FITS (flexible image transport system) access ***

*** www.lmsal.com/solarsoft/ ***

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MAIN directories:

SHOOTOUT - contains test programs and examples for DAVE and DAVE4VM using
the shootut data from Welsch [2007]

DAVE - contains dave.pro dave4vm.pro and other useful tools for analyzing magnetograms

MUD - MUDPACK elliptic solver

<http://www.cisl.ucar.edu/css/software/mudpack/>

elliptic2d.f has been upgraded to use George Fisher's "Simple Data Format"

sdf-0.74 - contains George Fisher's "Simple Data Format" release 0.74

This must be compiled and installed to compile elliptic2d

It is not necessary to compile SDF if you perform all the tests with the /no_elliptic2d flag. However it is still necessary to have the SDF idl libraries accessible (see make_all.pro below)

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Extra IDL code

SHOOTOUT/aspect.pro <http://www.dfanning.com/> (this is part of the LASCO distribution in SolarSoft but not part of a minimal SolarSoft distribution)

SHOOTOUT/plotimage.pro <http://cow.physics.wisc.edu/~craigm/idl/down/plotimage.pro>

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Main data archive

SHOOTOUT/make_all.pro (should be turnkey) performs all the calculations and makes all the plots and tables for the paper:

Schuck, "Tracking Vector Magnetograms with the Magnetic Induction

Equation," ApJ, Accepted: 2008 April 15.

SHOOTOUT/SCHUCK contains data, figures and tables corresponding to the windows and code in Schuck [2008] on the mask $|B| = \sqrt{B_x^2 + B_y^2 + B_z^2} > 370 \sim G$.
make

SHOOTOUT/WELSCH contains data, figures and tables corresponding to the windows and code in Schuck [2008] but on the mask $|B_z| > 370 \sim G$ used in Welsch [2007].

SHOOTOUT/old_shootout contains the shootout data from Welsch [2007] and undocumented code used for that paper

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Some relevant references

Schuck, "Tracking Vector Magnetograms with the Magnetic Induction Equation," ApJ, Accepted: 2008 April 15

Welsch, "Tests and Comparisons of Velocity Inversion Techniques," APJ, 670:2, 1434-1452, 2007.

Schuck, "Tracking Magnetic Footpoints with the Magnetic Induction Equation," ApJ, 646:1358-1391, 2006.

Schuck, "Local Correlation Tracking and the Magnetic Induction Equation" ApJL, 632:1, L53-L56, 2005.

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STEPS FOR INSTALLATION ON A LINUX SYSTEM:

[1] A minimal SolarSoft distribution must be installed mainly for FITS

access for example my minimal SolarSoft Distribution reports: 'SSW
setup will include: <gen>'

[2] (OPTIONAL) install the pazo math fonts

<http://ftp.math.purdue.edu/mirrors/ctan.org/fonts/mathpazo>

(see documentation in SHOOTOUT/make_all.pro). This is only REALLY
necessary if you want the special characters I used in some of the
plots to look correct (bold-faced vartheta, etc).

http://www.lmsal.com/solarsoft/index_old.html

[3] uncompress archive in your home directory or you may have to edit paths

```
tar -xvzf DAVE-DAVE4VM_1.0.tgz
```

[4] A Fresh compile of elliptic2d (which might not be necessary)

requires Absoft 32bit Fortran 95 9.0 r2. The present executable
runs under SUSE 10/11 0Linux on both 64 and 32 bit machines i've
tried

```
cd DAVE-DAVE4VM/MUD
```

```
make clean
```

```
make elliptic2d
```

[5] The DAVE directory must be added for IDL_PATH

something like: (bash)

```
export IDL_PATH=$HOME/DAVE-DAVE4VM/DAVE
```

or (tcsh)

```
setenv IDL_PATH $HOME/DAVE-DAVE4VM/DAVE
```

[6] run the code in DAVE-DAVE4VM/SHOOTOUT. Running all of the tests and making all of the figures takes some time so you may want to get some coffee.

```
cd $HOME/DAVE-DAVE4VM/SHOOTOUT
```

```
sswidl nox
```

```
make_all,/clean
```

```
make_all
```

or if you don't have a working version of elliptic2D

```
make_all,/no_elliptic2d
```

will use the saved vector potential I computed with elliptic2d

finally

```
make_all,/skip_optimize
```

will skip the window optimization calculations and load in the ones I computed for figure#1 (runs significantly faster).

Below are a pair of tcsh scripts I used for running everything from my top-level directory, but you may want to edit SHOOTOUT/batch_job.pro before using them.

```
schuck@hornet:~> more make_clean
```

```
#!/bin/tcsh
```

```
\rm -Rf MUD
```

```
\rm -Rf DAVE-DAVE4VM
```

```
setenv TOP `pwd`
```

```
tar -xvzf DAVE-DAVE4VM_1.0.tgz
```

```
cd $TOP/DAVE-DAVE4VM
```

```
test-suite.sh
```

```
schuck@hornet:~> more DAVE-DAVE4VM/test-suite.sh
```

```
#!/bin/tcsh
```

```
#
```

```
setenv DAVE_ROOT `pwd`
```

```
#
```

```
if ( ! ($?IDL_PATH) ) then
```

```
    setenv IDL_PATH .
```

```
endif
```

```
#
```

```
# This section will make mudpack with ABSOFT fortran
```

```
#cd MUD
```

```
#make clean
```

```
#make
```

```
#
```

```
# make george fisher's sdf
```

```
cd $DAVE_ROOT/SDF
```

```
make clean
```

```
make
```

```
#  
cd $DAVE_ROOT/SHOOTOUT  
setenv IDL_PATH $DAVE_ROOT/DAVE\:$DAVE_ROOT/SDF/idl\:$IDL_PATH  
  
# set up batch job  
setenv IDL_STARTUP $DAVE_ROOT/SHOOTOUT/batch_job.pro  
  
# start up solarsoft  
source $SSW/gen/setup/setup.ssw  
sswidl nox  
### end of tcsh script
```