

Analysis Methods in Atmospheric and Oceanic Science

AOSC 652

Introduction to Graphics and Analysis of Satellite
Measurements of Atmospheric Composition: Day 1

12 Sep 2016

AOSC 652: Analysis Methods in AOSC

Copy file ~rjs/aosc652/week_03/demo1.f
~rjs/aosc652/week_03/demo2.f
~rjs/aosc652/week_03/demo3.f

to your work area.

AOSC 652: Analysis Methods in AOSC

Please go the directory that contains output of the trig*.f programs we ran last week:

4,3

```
degree,cos,cos^2+sin^2,1.E8*(cos^2+sin^2-1.)
```

```
Output of program trig4.f
```

0.0	1.00000E+00	1.00000E+00	0.00000E+00
1.0	9.9985E-01	1.00000E+00	0.00000E+00
2.0	9.9939E-01	1.00000E+00	0.00000E+00
3.0	9.9863E-01	1.00000E+00	-1.1102E-08
4.0	9.9756E-01	1.00000E+00	-1.1102E-08
5.0	9.9619E-01	1.00000E+00	0.00000E+00
6.0	9.9452E-01	1.00000E+00	-1.1102E-08

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Please go to the directory that contains output of the trig*.f programs we ran last week:

of columns of data

4, 3

degree, cos, cos²+sin², 1.E8*(cos²+sin²-1.)

Output of program trig4.f

0.0	1.00000E+00	1.00000E+00	0.00000E+00
1.0	9.9985E-01	1.00000E+00	0.00000E+00
2.0	9.9939E-01	1.00000E+00	0.00000E+00
3.0	9.9863E-01	1.00000E+00	-1.1102E-08
4.0	9.9756E-01	1.00000E+00	-1.1102E-08
5.0	9.9619E-01	1.00000E+00	0.00000E+00
6.0	9.9452E-01	1.00000E+00	-1.1102E-08

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Please go the directory that contains output of the trig*.f programs we ran last week:

of header lines

4, 3

degree, cos, cos^2+sin^2, 1.E8*(cos^2+sin^2-1.)

Output of program trig4.f

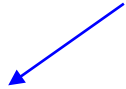
0.0	1.00000E+00	1.00000E+00	0.00000E+00
1.0	9.9985E-01	1.00000E+00	0.00000E+00
2.0	9.9939E-01	1.00000E+00	0.00000E+00
3.0	9.9863E-01	1.00000E+00	-1.1102E-08
4.0	9.9756E-01	1.00000E+00	-1.1102E-08
5.0	9.9619E-01	1.00000E+00	0.00000E+00
6.0	9.9452E-01	1.00000E+00	-1.1102E-08

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Please go the directory that contains output of the trig*.f programs we ran last week:

**Brief phrase describing content of each column,
separated by a comma**

4,3



degree, cos, cos²+sin², 1.E8*(cos²+sin²-1.)

Output of program trig4.f

0.0	1.00000E+00	1.00000E+00	0.00000E+00
1.0	9.9985E-01	1.00000E+00	0.00000E+00
2.0	9.9939E-01	1.00000E+00	0.00000E+00
3.0	9.9863E-01	1.00000E+00	-1.1102E-08
4.0	9.9756E-01	1.00000E+00	-1.1102E-08
5.0	9.9619E-01	1.00000E+00	0.00000E+00
6.0	9.9452E-01	1.00000E+00	-1.1102E-08

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Please go the directory that contains output of the trig*.f programs we ran last week:

4,3

degree, cos, cos²+sin², 1.E8*(cos²+sin²-1.)

Output of program trig4.f ← **Comment**

0.0	1.00000E+00	1.00000E+00	0.00000E+00
1.0	9.9985E-01	1.00000E+00	0.00000E+00
2.0	9.9939E-01	1.00000E+00	0.00000E+00
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6.0	9.9452E-01	1.00000E+00	-1.1102E-08

Date:

4 columns per record

delimited by space, comma, or tab

Standard File Format

Files trig1.dat, trig2.dat, trig3.dat, and trig4.dat (last week) are all files written according to the following format:

First record: Integer #1, Integer #2

Integer #1: number of columns of data

Integer #2: number of header lines in file (if left blank, default value is 3)

Second record: Brief mnemonic, separated by commas, describing content of each column

Example: degree,cos,cos²+sin²,1.E8*(cos²+sin²-1.)

Records 3 to Integer #2 – 2 :

Comments about the data: create date, create program, where data originated, version number, etc

Remaining records:

Data, delimited by spaces

Note: a numerical value of –999 (i.e., – 9.99E+02, or – 999.00) denotes missing data

MATLAB Interface With Our File Format

Copy the following into your working directory

```
~rjs/aosc652/week_03/load_header_data.m  
~rjs/aosc652/week_03/matlab_load_header_guide.m
```

This subroutine can be used in your Matlab code to read data files formatted for class

In your matlab code:

```
d_nm='/homes/metogra/username/etc...'; path to data file  
f_nm='filename.dat'; the name of the data file  
[hdr,dats]=load_header_data([d_nm,f_nm]);
```

The variable “hdr” will contain the header information from your data file

The variable “dats” will contain the data from the data file

Let's plot cosine(degree) versus degree

MATLAB folks: Walt will shows us how to plot cosine(degree) versus degree

Everyone else: please try to follow what I will present, for now 😊

If you would like to use GrADs, XLMA, WDSS-II, or any other plotting software other than MATLAB for this class, we have two requests:

1. Between now and Wed, be sure software can be accessed in KDE environment on metosrv8 ⇒ if not email Jeff, Ross, & Walt asap
2. Configure software to work with our file format (the removal of headers is not acceptable)

We will now make a plot of cos (column #2) versus degree (column #1)
from file trig4.dat created last week

Plot Program

To plot using a FORTRAN program that Ross wrote while in grad school 😊 :

Add the following lines to your `.aliases` file:

```
alias hppltd /homes/metofac/rjs/plt/metosrv8/hppltd.ver1.2.e
```

```
alias hp    '~/hp'
```

Then, copy:

`~rjs/aosc652/week_03/.hp` to your home directory

We'll produce plots using data in file `trig4.dat` (from last week) using the `hppltd` package.

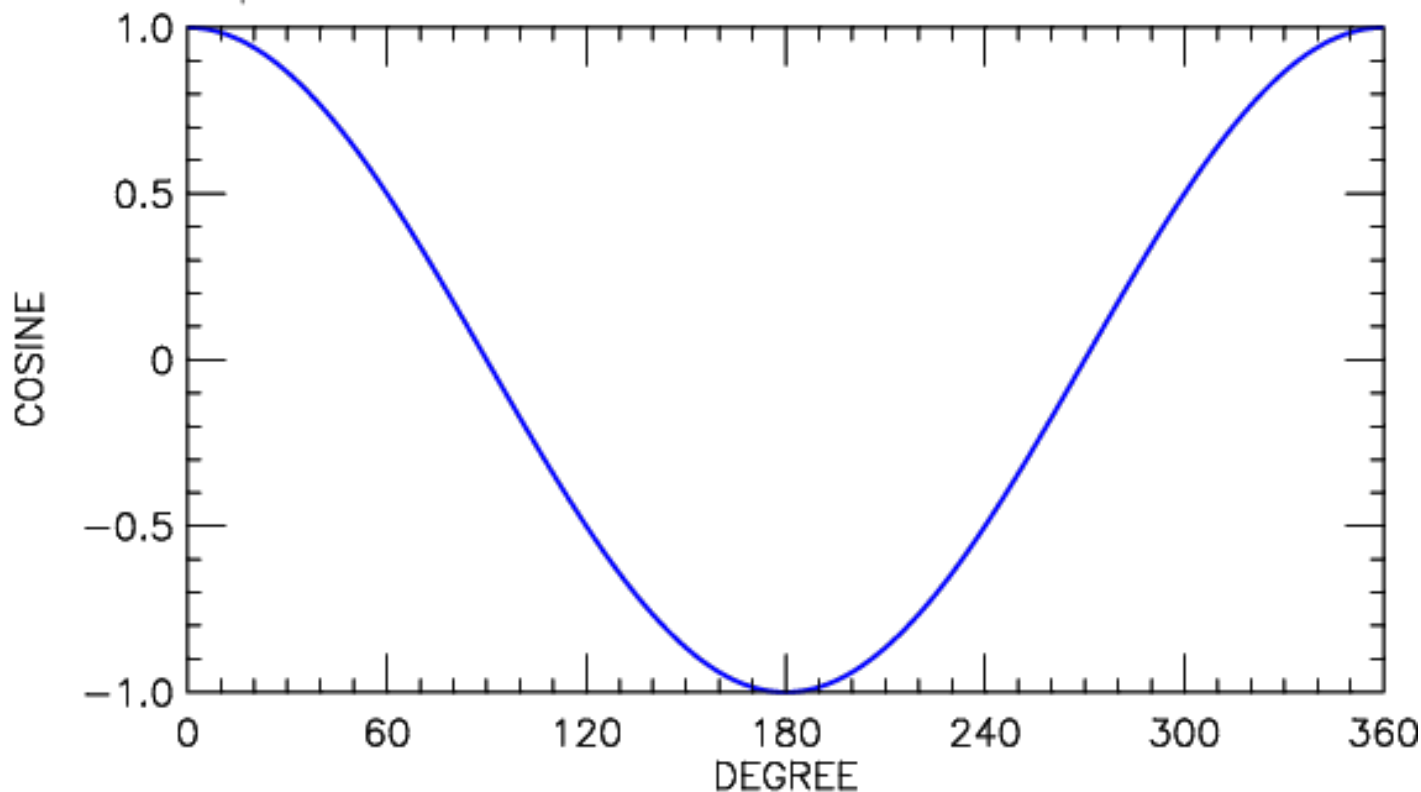
If you are able to plot data in this files using either `MATLAB`, `GRaDS`, `XLMA`, or `WDSS-II` or some other Linux utility, you are welcome to do so now (i.e., plot data in `trig4.dat`) rather than following this demo.

For those who will use the `hppltd` package, Ross will provide lots of help during throughout the class 😊.

Let's plot cosine(degree) versus degree

COSINE CURVE

Hope this works!



150914
/homes/melofac/rjs/assoc652/week_03/sincof.100

Creating a Plot

To create a new plot:

hppltd

Creates following files: `stncl.*` : record of your keystrokes
`*.hpgl` : “plot” in HP-GL syntax (ASCII file)

To produce `*.ps` and `*.eps` files of plot:

hp 100 (to execute `hppltd` using file `stncl.100` as input)

Note: `*.ps` & `*.eps` (encapsulated postscript) modern file type, also ASCII, to be edited only by true computer wizards.

See <http://en.wikipedia.org/wiki/HPGL>
http://en.wikipedia.org/wiki/Encapsulated_PostScript
<http://en.wikipedia.org/wiki/PostScript> for more info

To view `*.ps` or `*.eps` files in linux, enter `gv filename.ps`

`gv` ⇒ `ghostview`

Printing PS & EPS Files

To print filename.ps file:

lpr -Pinstlab filename.ps

or

lpr -Pcolor filename.ps

***Please do not print *.eps or *.ps files with the enscript command.
(or the lw aliases used to invoke the enscript command!)***

**Doing so will result in the file being printed in a literal fashion,
without postscript interpretation, which will waste lots of paper
and tie up the printer**

File Transfer Protocol

ftp ⇒ file transfer protocol

Subject: 2010/2011 WACCM Run: sim151f

From: Doug Kinnison <dkin@ucar.edu>

Date: Thu, 01 Sep 2011 13:37:08 -0600

To: Tim Canty <tcanty@atmos.umd.edu>

CC: Simone Tilmes <tilmes@ucar.edu>, "Ross J. Salawitch" <rjs@atmos.umd.edu>, George Mount <gmount@wsu.edu>

Dear Tim/Ross et al...

The simulation is done and I have placed the new file(s) on anonymous ftp.
ftp://acd.ucar.edu/user/dkin/For_Ross

I would only use this simulation (sim151f) in any future science projects (not the previous one).

It is much improved!

To get these files:

```
ftp acd.ucar.edu (username: anonymous & psswrđ: email_address)
cd user
cd dkin
cd For_Ross
ls
```


Let's Get Real Data !

Now we'll obtain data files of NASA Aura OMI measurements of ozone using anonymous ftp

(ftp ⇒ file transfer protocol)

```
ftp jwocky.gsfc.nasa.gov (anonymous; email_address)
cd pub
cd omi
cd data
ls
get 1README.txt
```

Let's Get Real Data !

Now we'll obtain data files of NASA Aura OMI measurements of ozone using anonymous ftp

(ftp ⇔ file transfer protocol)

```
ftp jwocky.gsfc.nasa.gov (anonymous; email_address)
```

```
cd pub
```

```
cd omi
```

```
cd data
```

```
ls
```

```
get 1README.txt
```

```
cd ozone
```

```
cd Y2016
```

```
ls
```

Then:

```
prompt
```

```
mget L3*201603*.txt (to "get" data for March 2016)
```

```
quit to end ftp session
```

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Please copy existing FORTRAN code from rjs directory to your directory:

Code is in:

`~rjs/aosc652/week_03/omi_ozone_interpolate_orig.f`

Copy this file to an appropriate location in your directory

Compile the code

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Please copy existing FORTRAN code from rjs directory to your directory:

Code is in:

`~rjs/aosc652/week_03/omi_ozone_interpolate_orig.f`

Copy this file to an appropriate location in your directory

Compile the code

Run the code and let me know what happens 😊

AOSC 652: Analysis Methods in AOSC

Between now and Wednesday:

1. Copy L3*OMI*201603*.txt files from ~rjs/aosc652/week_03 to your work area or obtain these files using ftp from jwocky
2. Edit omi_ozone_interpolate_orig.f to read L3* files from your directory:
Locate the text: /homes/metofac/rjs/aosc652/week_03/ in the code
and change to [the path where you have placed the L3* files](#)
3. Attempt to understand why this program is producing a run-time error !

Please work independently on this exercise ...
if you have any questions, please direct them to Ross, Jeff, or Walt