Compilation of CSIRO neutral density software:

Linux:

The following prevent this from working automatically:

- The scripts assume use of pmake, rather than make
- FC is not explicitly set, hence make looks for f77, rather than ifort
- Various f77 flags are set, which are not recognised by ifort
- The netcdf library paths need setting up

To compile gamma.a library:

1. Run `setup [version] intel-compilers` and `setup netcdfifort` (v9.1 of ifort used here…)
2. In the base directory, `cp Mfile-lib-SG Makefile`
3. Edit Makefile:
   i. replace the first line: `#!/usr/bin/pmake` with `#!/usr/bin/make`
   ii. Add line: `FC = ifort`
   iii. Change flags line to read:
   `FFLAGS = -O -f77rtl -no-cpprt`
   iv. On gamma.a instruction line, delete `MAKELIB` command
   v. Explicitly set read-nc.F compilation instructions:

```
read-nc.o: read-nc.F
            ifort -O -f77rtl -no-cpprt -c read-nc.F
```

Should now be able to compile gamma.a library using command:
`make –f Makefile` (or making script executable and running…)

To compile matlab fortran routines (gamma.a must be compiled first…):

1. cd matlab-interface
2. cp Mfile-SG Makefile
3. edit Makefile:
   i. Add line: FC = ifort
   ii. Change flags line to read: FFLAGS = -O2
   iii. Explicitly specify path to netcdf libraries:
   `LIBS= '-L/nerc/packages/netcdfifort/current/lib/ -lnetcdf'`
4. run `make all`. You should end up with two executables: glabel_matlab and nsfces_matlab, which interface with the matlab scripts of the same name.

For reference, Makefile used successfully here is given below:

```
PROGRAM = glabel_matlab nsfces_matlab

FFLAGS = -O2

.KEEP_STATE:

.PRECIOUS :

LIBS       =  ../gamma.a -L/nerc/packages/netcdfifort/current/lib/
-lnetcdf
```

```
FC = ifort

all: $(PROGRAM)

$(PROGRAM) : $$@.o
     $(FC) $(FFLAGS) -o $@ $@.o $(LIBS)

clean :
     rm -f *% core $@
```

Mac:

If f77 and netcdf libraries aren't available on the machine, they need to be installed. Should they need to be installed, this can be done fairly easily by first installing and setting up fink, then issuing commands:

`fink install netcdf-gfortran`
`fink install g77`

if running Leopard, support for unstable packages needs to be enabled by running `fink configure` before the install commands can be issued.

NB. It may be possible to compile under ifort. However, I had problems with segmentation faults so opted for f77 instead! I imagine you would just need the same flags as in the linux method above.

To compile gamma.a library:

1. In the base directory, `cp Mfile-lib-SG Makefile`
2. Edit Makefile:
   i. replace the first line: `#!/usr/bin/pmake` with `#!/usr/bin/make`
   ii. Delete `–nocpp` flag from `FFLAGS` rule
   iii. On gamma.a instruction line, delete `MAKELIB` command

Should now be able to compile gamma.a library using command:
`make –f Makefile` (or making script executable and running…)

To compile matlab fortran routines (gamma.a must be compiled first…):

1. cd matlab-interface
2. cp Mfile-SG Makefile
3. modify Makefile to read as follows (LIBS rule will need netcdf path altering if this is not installed via fink and not set up in the system path):

```
FFLAGS = -O2

.KEEP_STATE:

.PRECIOUS:

LIBS = ../gamma.a \
/sw/lib/netcdf-gfortran/lib/libnetcdff.dylib -lnetcdf
```

```
all: glabel_matlab nsfces_matlab

glabel_matlab: glabel_matlab.o
     $(FC) $(FFLAGS) –o glabel_matlab glabel_matlab.o $(LIBS)

nsfces_matlab: nsfces_matlab.o
     $(FC) $(FFLAGS) –o nsfces_matlab nsfces_matlab.o $(LIBS)

clean:
     rm –f *% core $@
```

---

3. run `make –f Makefile all`. You should end up with two executables: glabel_matlab and nsfces_matlab, which interface with the matlab scripts of the same name.
4. open gamma_n.m and neutral_surfaces.m
   Modify the lines where the code calls the external binaries to include their full path.
5. Add location of files to path in MATLAB