NeQuick_command usage:

Command: **NeQuick_command**

Version: *NeQuick-G v1.1*

Options:

-d :

default configuration, uses default input / output config files defined in constants CONFIGFILE and INPUTFILELIST. Those are NeQGalTest_config.dat and NeQGalTest_input_files.dat respectively.

The format of CONFIGFILE file is:

- a header line
- a number of lines including the following parameters:
  a0 a1 a2 example_identifier input_dir output_dir

where example_identifier is a set of characters attached to the output file names, input_dir is the directory where the input files are located (default is Input_data), and outpud_dir is the directory where the output files will be stored (default is Output_data).

The format of INPUTFILELIST file includes one file name per line.

The format of the **input files** includes a set of observations per line as follows:

month Time(UTC hours) lon(sta) lat(sta) heigth(sta) lon(sat) lat(sat) heigth(sat)

with latitude, longitude in degrees, height in meters and assuming WGS-84 ellipsoidal coordinates: geodetic latitude, geodetic longitude and ellipsoidal height. Year is not included in the computation but is kept for backward compatibility purposes.

The format of the **output files** includes a set of observations per line as follows:

month Time(UTC hours) lon(sta) lat(sta) heigth(sta) lon(sat) lat(sat) heigth(sat) modip(degrees) sTEC(TECU)

which is the same as the input file plus two new columns with modip and sTEC in TEC Units (TECU) where 1 TECU = $1x10^{16}$ electrons/m^2 .

-f <a0> <a1> <a2> <input_file> [<output_file>]

This option computes sTEC for the Effective Ionisation Coefficient parameters in the command line and the observations available in input_file

Parameters a0, a1 and a2 are the Effective Ionisation Coefficient parameters

The format of input_file is the same as for option -d

The format of output_file is the same as for option –d. If output_file is not specified, the name will be '<input_file>.out'

-e <extended_input_file> [<extended_output_file>]

This option is equivalent as option -f but including the the Effective Ionisation Parameter coefficients in the input and output files.

The format of the **input files** includes a set of observations per line as follows:

a0 a1 a2 month Time(UTC hours) lon(sta) lat(sta) heigth(sta) lon(sat) lat(sat) heigth(sat)

where a0, a1 and a2 are the Effective Ionisation Coefficient parameters, and with latitude, longitude in degrees, height in meters and assuming WGS-84 ellipsoidal coordinates: geodetic latitude, geodetic longitude and ellipsoidal height. Year is not included in the computation but is kept for backward compatibility purposes.

The format of the **output files** includes a set of observations per line as follows:

a0 a1 a2 month Time(UTC hours) lon(sta) lat(sta) heigth(sta) lon(sat) lat(sat) heigth(sat) modip(degrees) sTEC(TECU)

which is the same as the input file plus two new columns with modip and sTEC in TEC Units (TECU) where 1 TECU = $1x10^{16}$ electrons/m^2

-i

This option is equivalent as -e but the input parameters are provided through the standard input and sTEC is written in the standard output.

-c <a0> <a1> <a2> <month> <UT> <lon_station> <lat_station> <hei_station> <lon_satellite> <lat_satellite> <hei_satellite>

Estimates STEC according to the input command line arguments and prints this value in TECU in the standard output. The arguments a0, a1 and a2 are the Effective Ionisation Coefficient parameters and the latitude, longitude parameters are given in degrees, height in meters and assuming WGS-84 ellipsoidal coordinates: geodetic latitude, geodetic longitude and ellipsoidal height.

-m <longitude> <latitude>

Estimates modip according to the input parameters and prints this parameter in in the standard output. Latitude and longitude are given in degrees and assuming WGS-84 ellipsoidal coordinates.

-h :

shows help message.

Examples:

Default:
The command:

```
./NeQuick_command.exe -d
```

generates a set of files in the Output/ directory based on the Input files in Input/ directory (a set of Input – Output files for validation are provided in the package).

File based:
The command:

```
./NeQuick_command.exe -f 121.129893 0.351254133 0.0134635348
Examples/kour_in.dat Examples/kour_out_med.dat
```

generates the output file Output file: Examples/kour_out_med.dat

File based extended:
The command:

```
./NeQuick_command.exe -e Examples/mali_extended_in.dat
```

generates the output file: Examples/mali_extended_in.dat.out

File based extended from standard input/output:
The command:

```
./NeQuick_command.exe -i  < Examples/pert_extended_in.dat >
Examples/pert_out_sTEC.dat
```

generates the output file: Examples/pert_out_sTEC.dat

Command-line:
The command:

```
./NeQuick_command.exe -c 236.831641 -0.39362878 0.00402826613 4
18.83333   297.65954    82.49429        78.10745    35.05694
30.86994  20508143.88593
```

prints the sTEC value (in TECu) in the standard output:

```
37.87588
```

Modip calculation:
The command:

```
$ ./NeQuick_command.exe -m 115.88524 -31.80197
```

prints in the standard output the modip value (in degrees):

```
-51.37982
```