# Homework#2

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1. **Calculate and present the sample (or experimental) variograms of the 118 Z values at two lag spacing (h=2, 4). Please using GSLIB.**

***Note: Your report for this homework should at least include the following:***

- The parameter files
- The graphs for variogram

```
                      Parameters for GAM
                      ******************
START OF PARAMETERS:
Z118.dat        \file with data
1   2             \   number of variables, column numbers
-1.0e21     1.0e21    \   trimming limits
gam_out.txt               \file for variogram output
1                         \grid or realization number
118   1.0   2.0           \nx, xmn, xsiz
 1   1.0   2.0           \ny, ymn, ysiz
 1   1.0   2.0           \nz, zmn, zsiz
2  10                     \number of directions, number of lags
1  0  0                  \ixd(1),iyd(1),izd(1)
2  0  0                  \ixd(1),iyd(1),izd(1)
0                         \standardize sill? (0=no, 1=yes)
1                         \number of variograms
1   1   1                 \tail variable, head variable, variogram type
```

Figure 1 gam_par.txt

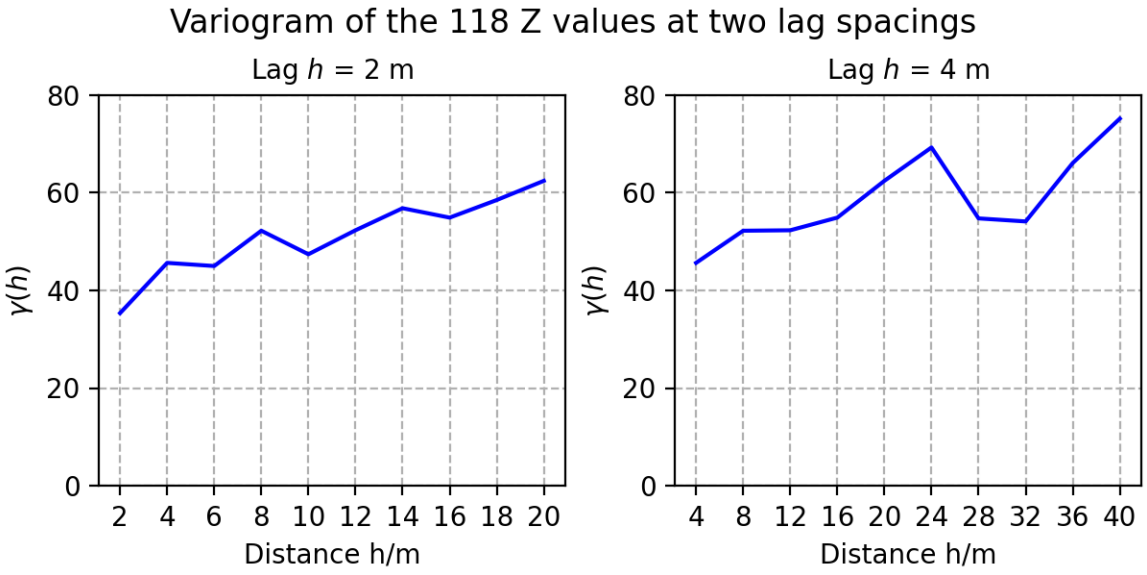


Figure 2 Variogram of the 118Z values at two lag spacings

**2. For the sample data set 470 V values**

a. Calculate and present the omnidirectional variograms of the data set with lag = 5m and 10m (i.e., Figure 7.2 and 7.3 of the textbook);

b. Calculate and present their directional variograms (i.e., Figure 7.7 of the textbook);

c. Plot a rose diagram of the nine ranges (i.e., Figure 7.9 of the textbook) and fit an ellipse;

d. Calculate and present the maximum and minimum directional variograms with different angular tolerances (i.e., Figure 7.10 of the textbook).

**Note:** 1) The number of cells in X- and Y-direction should be around 260 and 300.

2) See the end of this handout to learn how to plot a rose diagram.

***Your report for this homework should at least include the following:***

- The parameter files.
- Submit two figures of the omnidirectional variograms with lag 5m and 10m. (i.e., the same figures as in Figs. 7.2 and 7.3).
- Submit nine figures for nine directional variograms. (i.e., the same figures as in Fig. 7.7).
- Submit a figure for rose diagram of the nine ranges with a fitting ellipse. (i.e., the same figure as in Fig. 7.9).
- Submit four figures for maximum (N140W) and minimum (N760E) directional variograms with different angular tolerances. (i.e., the same figures as in Fig. 7.10).

**Note:** Rose diagram was plotted with a polar plot in MATLAB for the ranges, 18.5, 17.8, 19.8, 23.2, 29.9, 32.9, 29.3, 25.8, 21.4 in the directions, N90E, N70E, N50E, N30E, N10E,N10W, N30W,N50W,N70W.

a.

```
                      Parameters for GAMV
                      *******************
START OF PARAMETERS:
V470.dat                              \file with data
1   2   0                             \ columns for X, Y, Z coordinates
1   3                                 \ number of varables, column numbers
-1.0e21     1.0e21                    \ trimming limits
                                            \file for variogram output
gamv_out5.txt
20                                    \number of lags
5.0                                   \lag separation distance
2.5                                   \lag tolerance
1                                     \number of directions
0.0  90.0 1.0e21      0.0  90.0  1.0e21  \azm, atol, bandh, dip, dtol, bandv
0                                     \standardize sills? (0=no, 1=yes)
1                                     \number of variograms
1   1   1                             \tail var., head var., variogram type
```

Figure 3 gamv_par5.txt

```
                      Parameters for GAMV
                      *******************
START OF PARAMETERS:
V470.dat                              \file with data
1   2   0                             \ columns for X, Y, Z coordinates
1   3                                 \ number of varables, column numbers
-1.0e21     1.0e21                    \ trimming limits
gamv_out10.txt                              \file for variogram output
10                                    \number of lags
10.0                                        \lag separation distance
5                                     \lag tolerance
1                                     \number of directions
0.0   90.0 1.0e21      0.0   90.0   1.0e21   \azm, atol, bandh, dip, dtol, bandv
0                                     \standardize sills? (0=no, 1=yes)
1                                     \number of variograms
1   1   1                             \tail var., head var., variogram type
```

Figure 4 gamv_par10.txt

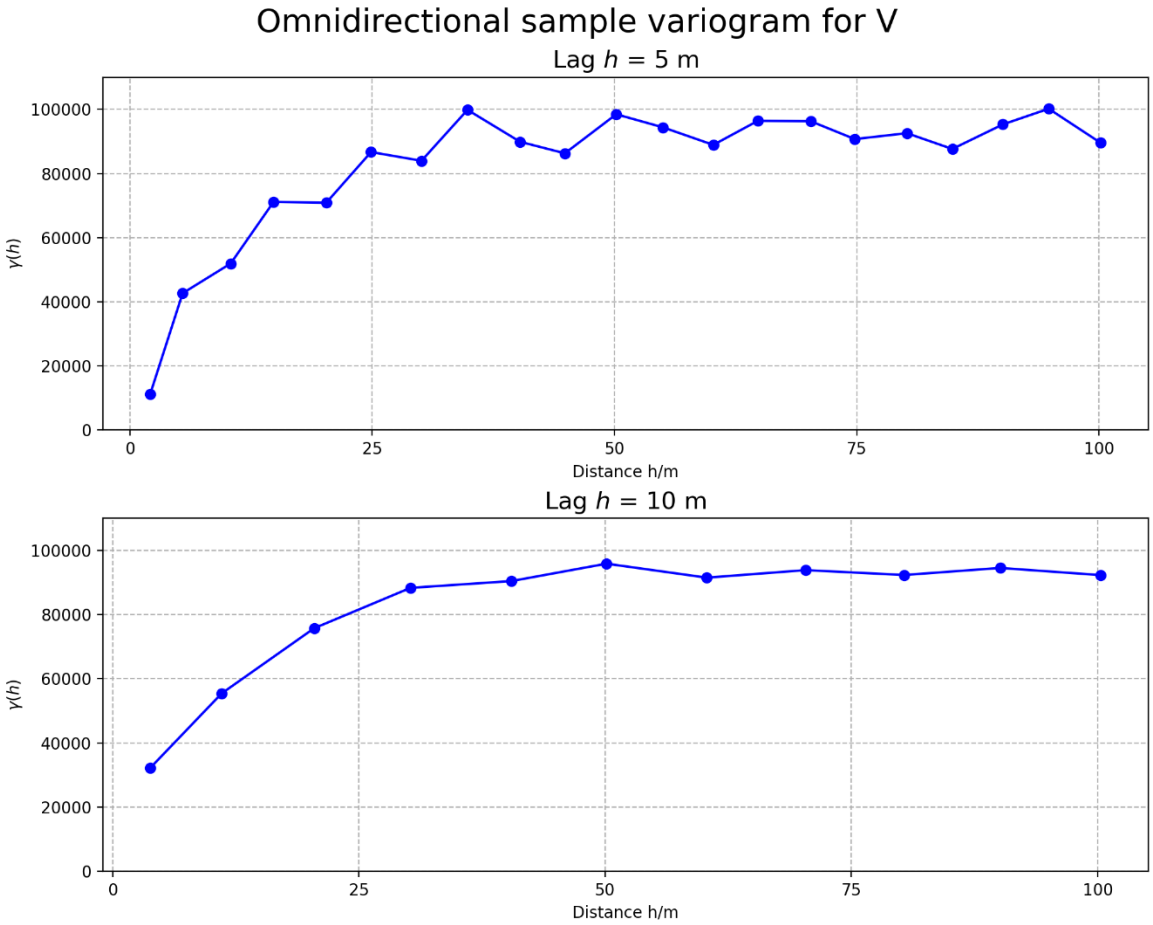


Figure 5 Omnidirectional sample variogram for V

b.

```
                      Parameters for GAMV
                      *******************
START OF PARAMETERS:
V470.dat                              \file with data
1   2   0                             \ columns for X, Y, Z coordinates
1   3                                 \ number of varables, column numbers
-1.0e21     1.0e21                    \ trimming limits
gamv_out9.txt                               \file for variogram output
10                                    \number of lags
10.0                                        \lag separation distance
5                                     \lag tolerance
9                                     \number of directions
90  45 20.00      0.0  45  20.00     \azm, atol, bandh, dip, dtol, bandv
70  45 20.00      0.0  45  20.00     \azm, atol, bandh, dip, dtol, bandv
50  45 20.00      0.0  45  20.00     \azm, atol, bandh, dip, dtol, bandv
30  45 20.00      0.0  45  20.00     \azm, atol, bandh, dip, dtol, bandv
10  45 20.00      0.0  45  20.00     \azm, atol, bandh, dip, dtol, bandv
-10  45 20.00      0.0  45  20.00          \azm, atol, bandh, dip, dtol, bandv
-30  45 20.00      0.0  45  20.00          \azm, atol, bandh, dip, dtol, bandv
-50  45 20.00      0.0  45  20.00          \azm, atol, bandh, dip, dtol, bandv
-70  45 20.00      0.0  45  20.00          \azm, atol, bandh, dip, dtol, bandv
0                                     \standardize sills? (0=no, 1=yes)
1                                     \number of variograms
1   1   1                             \tail var., head var., variogram type
```

Figure 6 gamv_par.txt

(Figure in next page.)

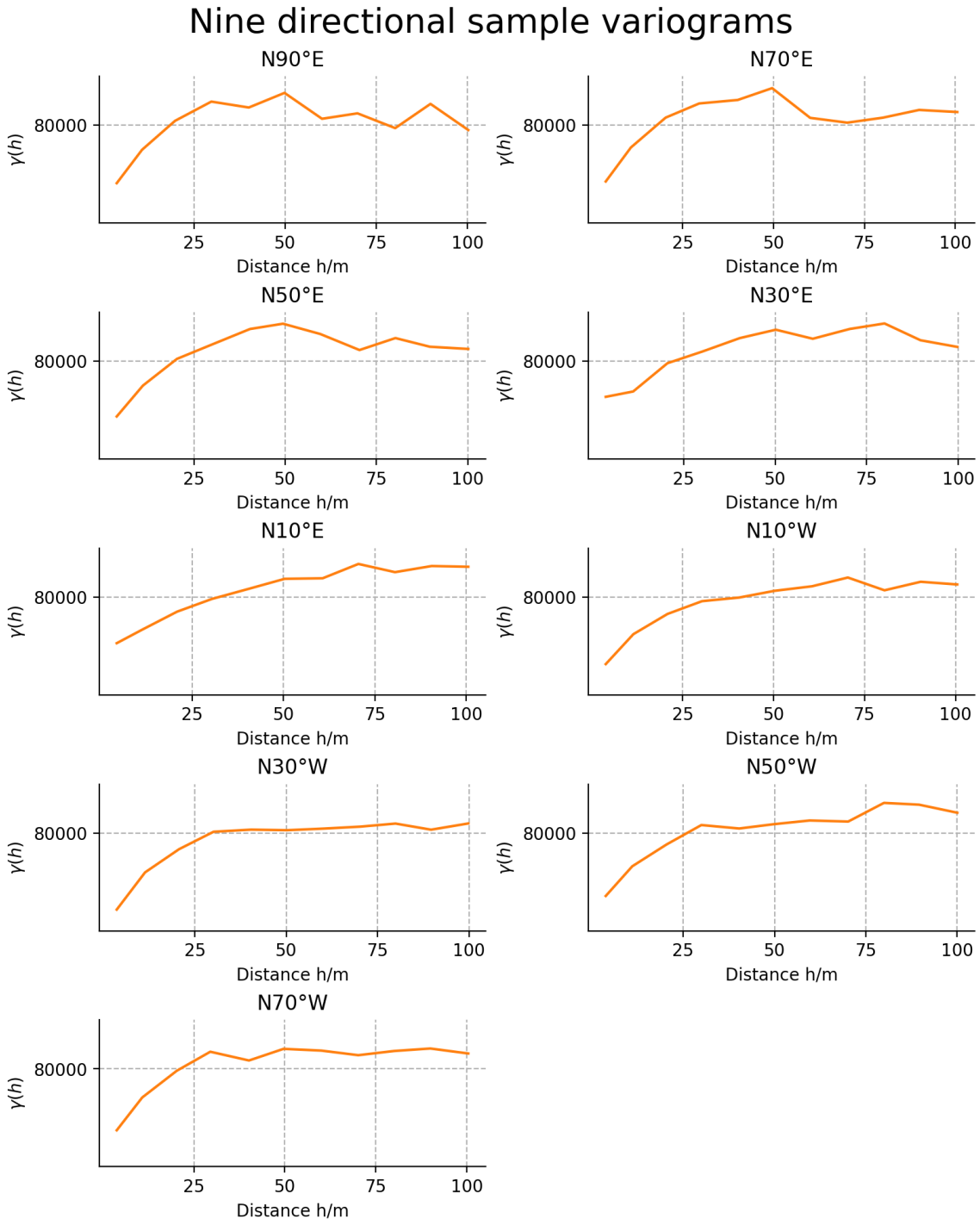


Figure 7 Nine directional sample variogram

c.

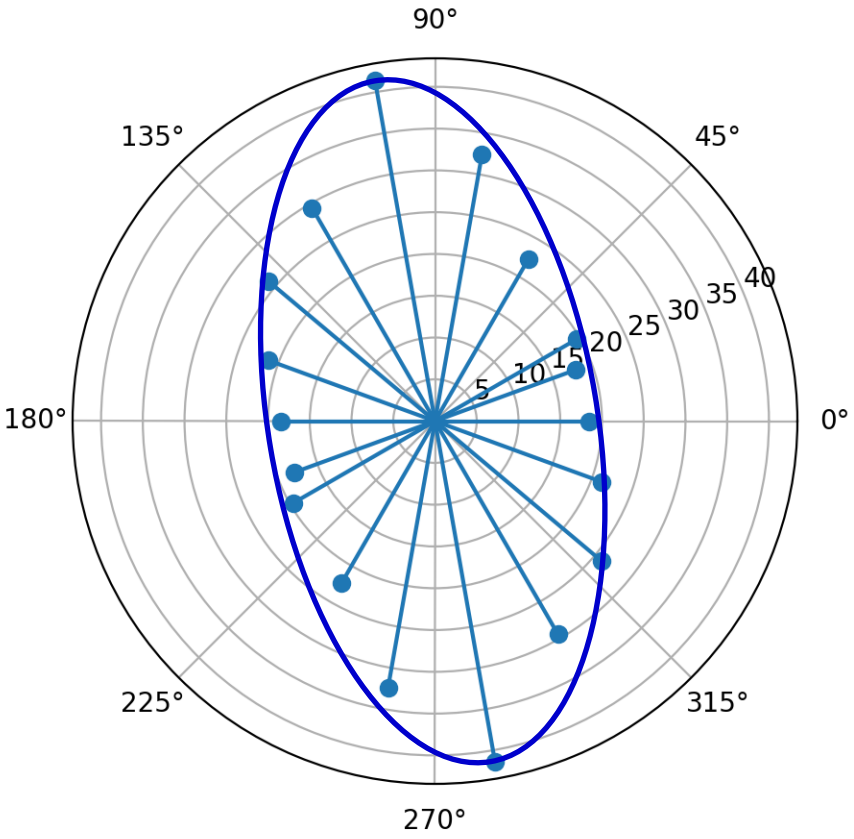


Figure 8 Rose Map

d.

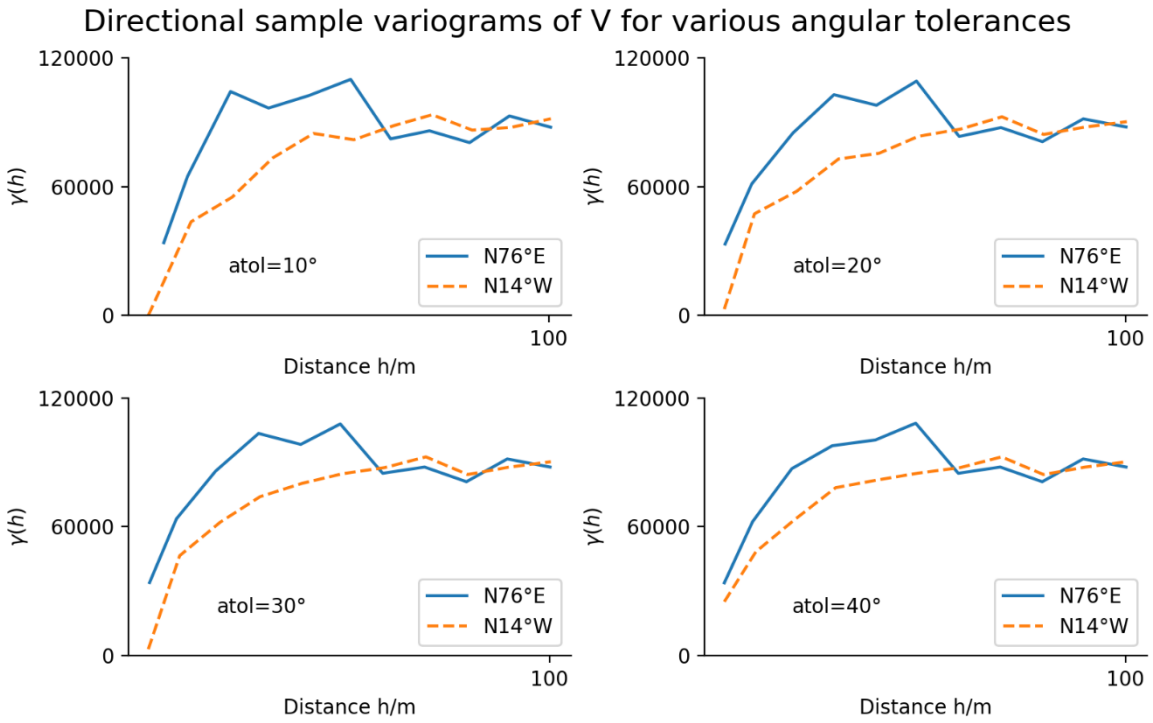


Figure 9 Directional sample variograms of V for various angular tolerances