

FIELDGEN

Generating (log-)normal distributed correlated random fields in ASCII-Grid-file format.

Command: `fieldgen <outfile> <ncols> <nrows> <xll> <yll> <cellsize> <nodata-value>
<average> <std.dev.> <corr-length-x> <corr-length-y>
[init_value=<init_value>] [<cm_log=0|1>]`

The ASCII formatted output grid is specified by its name <outfile>, its dimensions <ncols> and <nrows> (number of columns and rows), the coordinates of the lower left corner <xll> and <yll>, the <cellsize> and the nodata-value. The grid values are generated randomly according to the given parameters <average> and <standard deviation> of the probability distribution. A correlation length relative to the cellsize have to be specified for each direction. The range for the correlation length is within >0 to 1. In order to get well defined reproducible results, the random number generator can be initialized by the option `init_value=<init_value>`, with `init_value` as any number. Each run which uses the same `init_value` will deliver identical grids. The results are usually normally distributed. However, the option `cm_log=1` forces the program to generate a log-normal distribution (LN3). The generated random values are then interpreted to be exponents for the parameters <average> and <standard deviation> to the base 10, so the result grid will contain the powers of the random numbers to the base 10. The lower limit is 0 (third parameter of a 3 parameter log-normal distribution). The statistic shown with GRIDSTAT will therefore not match the given parameters for <average> and <std.dev.>, because it does not refer to the exponents but to the plain values. FIELDGEN can be used e.g. for generating K_f -values with a spatial correlation and anisotropy, e.g. for the WaSiM groundwater module. If the correlation length' are very small, the generated field is spatially virtually uncorrelated and normal (or log-normal) distributed. However, because of the used generation methodology it is better to use the program GRIDGAUS for generating uncorrelated fields, because correlation lengths of 0 are not supported in FIELDGEN. An equal distribution may be achieved by a very large standard deviation, but, again, this should be done with another program, this time the program GRIDRAND, which generates uncorrelated, equally distributed random numbers (e.g. for generating land use distributions). The Program FGM offers all of the above described functionality with a Windows GUI.