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1.Geographical Information System. QGIS

QGIS is the most popular GIS tool with an impressive trajectory and a vibrant community. It also even has a particular ecosystem of complements called “plugins”. QGIS is a completely open source alternative that reduces the cost barriers since it does not need a paid license and can be executed in any operative system.

2. SAGA GIS

SAGA GIS is a GIS platform oriented to spatial analysis. SAGA GIS is a simple but powerful tool, with a big library focused on spatial analysis and characterization of basins. The interpolation options in SAGA GIS are better implemented than in other free and commercial software.

3. HEC-RAS

The numerical model HEC-RAS is developed by the U.S. Army Corps of Engineers. This model uses the gradient and topography to evaluate the flow depth, velocities and flooded zones. It is also useful to calculate sediment transport and water temperature.

4. iRIC

iRIC (International River Interface Cooperative) is a software developed with the purpose of offering a complete simulation environment of the riverbed and its results can be exported and used to analyze, mitigate and prevent disasters, through the visualization of the results of the river simulation.

5. HEC-HMS

The Hydrologic Modeling System (HEC-HMS) is designed to simulate the hydrologic processes in basins. The software includes traditional procedures of hydrologic analysis, such as infiltration events, unit hydrograms and routing. HEC-HMS also includes modules for evapotranspiration, snow melting and calculus of soil humidity.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| time | runoff | baseflow | direct runoff | depth of direct runoff | 2hr unit hydrograph ordinate | | |
| 1 | 110 | 110 | 0 | 1.415 | 0 |  |  |
| 2 | 120 | 110 | 10 | 1.415 | 7.067138 |  |  |
| 3 | 230 | 110 | 120 | 1.415 | 84.80565 |  |  |
| 4 | 570 | 110 | 460 | 1.415 | 325.0883 |  |  |
| 5 | 640 | 110 | 530 | 1.415 | 374.5583 |  |  |
| 6 | 430 | 110 | 320 | 1.415 | 226.1484 |  |  |
| 7 | 290 | 110 | 180 | 1.415 | 127.2085 |  |  |
| 8 | 200 | 110 | 90 | 1.415 | 63.60424 |  |  |
| 9 | 160 | 110 | 50 | 1.415 | 35.33569 |  |  |
| 10 | 120 | 110 | 10 | 1.415 | 7.067138 |  |  |
| 11 | 90 | 90 | 0 | 1.415 | 0 |  |  |
| 12 | 80 | 80 | 0 | 1.415 | 0 |  |  |