

## **The method of calculation of flooding zones on an territory with the use of digital elevation model on the basis of successive pools**

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**Abstract:** Floods inflict an enormous damage to the environment and present a threat for people's life that stipulates actuality of fight against these elements. For many areas of Kazakhstan the most dangers are presented by floods in the period of spring tide and drifting of ice on the rivers, and also flood of the localities, related to destruction of dams of storage pools, washing away of protective dikes. Harm that is brought to humanity is enormous, especially if to take into account not only the line but also indirect damage.

In our case the set of laws and rules, on which moves water, that is set by a hypsography from a digital map and laws of hydrodynamics of streams of water locomotive on a surface depending on hydrodynamic laws.

Changing of the states in contiguous pools takes place simultaneously and in parallel, and time goes discretely. In spite of seeming simplicity of motion of stream, characters of mutual relations between pools can be various and different. And here in a role rules of cellular automats can enter. Cellular automats can apply on the role of universal instrument, allowing to describe the mechanism of processes that is described other methods can't be. Otherwise speaking, cellular automats – it's methodology of presentation of task that puts before itself an aim breaking up a large task on the great number of discrete, shallow tasks so that problem definition for one element simultaneously is all problem definition for all elements.

For determination of volume of run out water from the river it is necessary to know speed of flow of the river and area of living section of the river. Using the well-known formula of Shezi for determination of middle speed of streams at the set even turbulent motion of liquid in area of quadratic resistance for the case of free water there is speed of water in river-beds:

$$v_a = C\sqrt{R \cdot I},$$

where  $v_a$ — average flow rate, meters per second;  $C$  — coefficient of resistance of friction on length (coefficient of Shezi), being integral description of forces of resistance;  $R$  — hydraulic radius,  $m$ ;  $I$  —hydraulic slope  $m/m$ .

**Keywords:** flooding zones, digital elevation model, successive pools, Shezi.

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