RIVER FORMATION DYNAMICS

Alberto Alfonso

River formation dynamics (RFD) is an heuristic method similar to ant colony optimization (ACO). It can be seen as a gradient version of ACO, based on copying how water forms rivers by eroding the ground and depositing sediments. As water transforms the environment, altitudes of places are dynamically modified, and decreasing gradients are constructed. The gradients are followed by subsequent drops to create new gradients, reinforcing the best ones. By doing so, good solutions are given in the form of decreasing altitudes. This method has been applied to solve different NP-complete problems (for example, the problems of finding a minimum distances tree and finding a minimum spanning tree in a variable-cost graph). The gradient orientation of RFD makes it specially suitable for solving these problems and provides a good tradeoff between finding good results and not spending much computational time. In fact, RFD fits particularly well for problems consisting in forming a kind of covering tree.