Abstract:
In many parts of Iran, underground water is the main source for agriculture, industries and drnking water and this valuable source is negatively affected by over usage of the main sources is many of these areas. It is vital to maintain these resources since they are extremely valuable for the ecosystem of the country. The valuation of aquifer affinity index is useful for the development and maintaining the agricultural lands, quality control of the underground resources and it can also play a major role in providing management schemes for these resources. Thus, the priority of the process is with the valuation of aquifer affinity index. Irregular distribution of water resources and inappropriate usage of them can be the result of many water problems. Mashhad veld contains many agricultural lands that as the result of over usage of nitrate fertilizer became one of the vulnerable areas. In this research, three methods have been used to prepare the plan of aquifer pollution. These methods are: "Standard drastic", ANP and artificial immune systems. At the end of the research, a plan has been produced based on each of the mentioned methods that show vulnerable areas in the veld of Mashhad. The three proposed models were computed based on the amount of the calculated nitrate. The affinity index for "Standard drastic", Cuated methods" and "Immune system" are 51, 63 and 90 percent. As the result, that means "Neural" methods, "Curated derastic" and "Standard drastic" have shown correct reactions in calculating the aquifer affinity index.In addition, it can be concluded that based on the different methods used in calculating the index, the expert system was truly effective as well as convenient and also increased the experiment process comparing to other methods.

Keywords: Qualitative vulnerability, Groundwater, Mashhad plain, neural network, DRASTIC, ANP

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The Thesis Submitted for the Degree of M.Sc.
(In the Field of Water Resources Management)

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January 2017