Methodology in Hydrology (Proceedings of the Second International Symposium on Methodology in Hydrology held in Nanjing, China, October–November 2005). IAHS Publ. 311, 2007. 384–389.

Nonparametric grade assessment method for water quality

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Abstract Precise assessment of water quality is vital to the sustainable development of water resources systems. Common assessment methods need prior knowledge of the structure form of the assessment function presumed, so it is difficult to adapt to complex assessment systems. The nonparametric grade assessment method (NGAM) was presented. The method did not require the structure form of the assessment function, which could be obtained directly from assessment standard table data with similitude principle. The method was: first produce assessment samples through the standard table; then optimize the window-width of the kernel function with genetic algorithm to obtain weights of different samples; finally establish the similitude assessment model. The results (average absolute grade error is below 0.04 grade; relative grade error is below 1.40%) indicate the NGAM is effective, general and also of high precision. Therefore, the method can be applied to both prediction and simulation of different water resources systems.

Keywords assessment method; changeable window-width; genetic algorithm; grade assessment; kernel function; nonparametric; similitude; water quality