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USE OF THE SPATIAL ANALYSIS NEURAL NETWORK (SANN) METHOD FOR REGIONAL GROUNDWATER CONTAMINATION DECISION-MAKING

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ABSTRACT

Spatial Analysis Neural Network (SANN) is a specified neural network for conducting the spatial analysis of any type of variable. It provides a nonparametric mean estimator and also estimators of higher order statistics such as standard deviation and skewness. In addition, it provides a decision-making tool, including an estimator of posterior probability that a spatial variable at a given point will belong to various classes representing the severity of the problem of interest, and a Bayesian classifier to define the boundaries of subregions belonging to the classes. In this paper, the use of SANN as a decision-making tool to investigate an area contaminated by viruses in a groundwater system is illustrated. SANN provides two pieces of information; the contamination probability that the virus decay rate at a given point is less than a predefined threshold value, and the classification map defining contaminated and non-contaminated regions. The method is applied to several cases with varying threshold levels of the observed virus decay rate values, and the results show graphically the extent of the contaminated region and the change of the contamination probabilities.

Reference: Shin, H.; Use of the Spatial Analysis Neural Network (SANN) Method for Regional Groundwater Contamination Decision-Making, Journal of Environmental Hydrology, Vol. 5, Paper 4, July 1997.

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