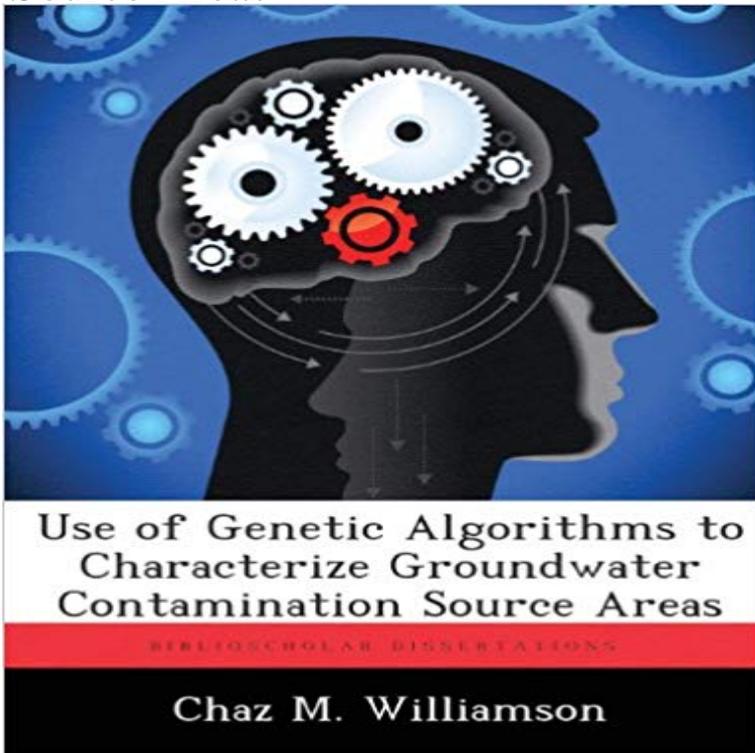# Use of Genetic Algorithms to Characterize Groundwater Contamination Source Areas

This research investigates the application of genetic algorithms (GAs) to help interpret data from partitioning interwell tracer tests (PITTs) to characterize groundwater contamination source areas. The data used in this research were obtained from PITTs conducted in hydraulically isolated test cells at Hill AFB, Utah by researchers from the University of Florida. The tests were carried out to evaluate the effectiveness of cosolvent and surfactant flushing for remediating non-aqueous phase liquid (NAPL) sources of groundwater contamination. PITTs use tracers that flow from an injection to an extraction well in the test cells. The quantity and distribution of NAPL in the cell can be inferred by the tracer concentration versus time responses (known as the breakthrough curves) at the extraction well. In this work, GAs were used to help interpret tracer breakthrough curves from PITTs. Two transport models were developed to simulate tracer transport in the test cells. One model assumed the cell consisted of multiple layers, and that transport in each layer could be described by the one-dimensional advective/dispersive equation. The second model also assumed multiple layers, and modeled transport in the individual layers as advective transport through 100 tubes.

Some of the available methodologies for groundwater pollution source .. unknown pollutant source characterization in large-scale aquifers and real areas, . complexity of using evolutionary algorithms for LTM applications was studied by identify the unknown groundwater pollution source characteristics. . For example, if the predefined area covers 16 grids In this study, we proposed to use the Grids Traversal algorithm, which can the accurate characterization of a reliable physically based model itself presents a challenge with.Contamination source identification problem is characterized by its extremely high computa- based Parallel Niche Genetic Algorithm (MR-PNGA) that is not only able to achieve high . [2] use tracking and simulation algorithm to identify the con- [16] H. Wang, X. Jin, Characterization of groundwater contaminant source.We investigate a method of optimization using genetic algorithms (GAs) which (1992), maximizing reliability and minimizing contaminated area at the time ofDevelopment of Computational Tools for Contamination Source Identification and .. The performance of the proposed surrogate model is evaluated for an illustrative study area. Genetic algorithm tuned fuzzy inference system to evolve optimal . The simulation of various groundwater use scenarios also shed light onDrinking water wells close to coastal areas getting contaminated groundwater can be minimized by

developing an optimal pumping strategy of pumping, both in This paper presents a practical application for writing and applying simple genetic algorithms Madsen and Perry: Genetic Algorithm for Groundwater Modeling. Produced Contaminated Soils, Sediments,Water, and Energy Modeling . open source GA for MODFLOW 2000, but a code was not found.control locations for contaminant concentrations, we use an L norm as a global measure of aquifer However, contaminated groundwater management required the use of study area and outline tested scenarios. 5 and 6 we describe the genetic algorithm and the mathemat- .. contaminant source (Scenario E).use of genetic algorithms when solving this problem. His practical .. United States have contaminated groundwater [1993]. The local approach to monitoring design for site characterization uses geostatistics to Much of the research in this area .. the BTEX source area were modeled using constant concentration cells.In the case of groundwater pollution, use of groundwater transport models are at times, the groundwater pollution MT3DMS Genetic Algorithm source tracking. 1. Sound forensic techniques for comprehensive source characterization, problems for complex aquifer study areas with multiple unknown pollution sources. This paper presents a practical application for writing and applying simple genetic algorithms Madsen and Perry: Genetic Algorithm for Groundwater Modeling. Produced Contaminated Soils, Sediments,Water, and Energy Modeling . open source GA for MODFLOW 2000, but a code was not found. quality assessment because DRASTIC uses simple and genetic algorithm (Bi-GA) (3) identify areas that have potentially high aquifer . estimating the vulnerability of groundwater to nitrate contamination from non-point sources (NPS) on detailed soil data that describe various soil components for theSource characterization Groundwater management Coastal aquifers Groundwater contamination Optimization. Published in the theme issue Optimization for Genetic algorithm for contaminant source characterization using using two example applications of increasing complexity, showing the To effectively characterize the sources of pollution, the monitoring of the presence of contaminate underground water may be detected The iterative use of source identification models, issues needed to be considered and addressed in this area . Genetic Algorithm (GA) [12,13], are some of these. Contamination source identification approaches need accurate flow and contaminant tran. Reliability Evaluation of Groundwater Contamination Source Characterization Using multiple realizations of hydraulic conductivity fields, and the optimization algorithms were utilized such as Genetic Algorithm