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## **Optimal Configuration Design of Geodetic Networks Using Penalty Function-Based Genetic Algorithm**

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This paper suggests a new method for designing an optimum geodetic network using genetic algorithms. Optimization using genetic algorithms needs neither linearization nor differentiation of the object function or the constraint equations. As genetic algorithm uses simple mathematical computations it is easy to implement. In constraint problems one can use penalty functions to redefine the problems as unconstrained ones. This paper uses genetic algorithm to find out the optimum location for stations of a geodetic network. The network is designed in a way that the variance-covariance of the estimated parameters optimally approximates the criterion matrix. The paper reviews different components of the genetic algorithm and shows its efficiency using some numerical examples.