Using an ant colony optimization (ACO) algorithm to estimate variance components

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A number of alternative methods have been proposed to estimate variance components, which include: maximum likelihood, minimum norm quadratic unbiased estimation, minimum variance quadratic unbiased estimation, Helmert method estimation, least-squares variance component estimation and so on. The typical problem with estimation of variance components is obtaining negative variance components. The problem might be due to in-correct assumed linear stochastic model. In this contribution, we considered a nonlinear variance component model. To overcome the non linearity, ant colony optimization algorithm (ACO) is applied successfully. The aim of a ACO is to search and determine the most suitable solution for optimizing an objective function over a discrete set of feasible solutions. The proposed method have been successfully implemented through an example.