



A Swarm Intelligence Based (SIB) Method for Optimization in Designs of Experiments

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Natural heuristic methods, like the particle swarm optimization and many others, enjoy fast convergence towards optimal solution via a series of inter-particle communication. Such methods are common for the optimization problem in engineering, but few in statistics problems. It is especially difficult to implement in the field of experimental designs as the search spaces are mostly discrete, while most natural heuristic methods require continuous search domains. This talk introduces a new method called Swarm Intelligence Based (SIB) method for optimizing experimental designs. It is a natural heuristic method that includes the new operations, called MIX and MOVE, for combining two designs and selecting the best designs respectively. This method is advantageous over the traditional particle swarm optimization in the sense that it is ready for the search of both continuous and discrete domains, and its global best particle is guaranteed to monotonically move towards the optimum. The SIB method is demonstrated in some applications, including the searches of supersaturated designs, circulant partial Hadamard matrices, etc.

Keywords: Heuristic; Optimization; Swarm Intelligence; Experimental Designs.