

A New Evolutionary Algorithm for Multi-Objective Cylindrical Spur Gear Design Optimization

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Abstract : The present paper introduces a modified adaptive mixed differential evolution (MAMDE) to select the main geometry parameters of specific cylindrical spur gear. The developed algorithm used the self-adaptive mechanism in order to update the values of mutation and crossover factors. The feasibility rules are used in the selection phase to improve the search exploration of MAMDE. Moreover, the elitism is performed to keep the best individual found in each generation. For the constraints handling the normalization method is used to treat each constraint design equally. The finite element analysis is used to confirm the optimization results for the maximum bending resistance. The simulation results reached in this paper indicate clearly that the proposed algorithm is very competitive in precision gear design optimization.

Keywords : evolutionary algorithm, spur gear, tooth profile, meta-heuristics

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