**A modified Differential Evolution Algorithm for the Solution of a Large Scale Unit Commitment Problem**

*Nisma Saleem\*[[1]](#footnote-1), Aftab Ahmad[[2]](#footnote-2)& Salman Zafar[[3]](#footnote-3)*

*Electrical Engineering Department, University of Engineering & Technology, Taxila 47050, Pakistan*

**ABSTRACT**

The Unit Commitment (UC) problem is a non-linear and complex optimization problem used to determine the start-up and shut-down scheduling of power generating units to meet the forecasted load demand and spinning reserve over a specified time horizon so that the target of production cost minimization is achieved while satisfying various system and generator based constraints. The increase in computational burden with the system size requires more efficient meta-heuristic approaches for solving the UC problem. This paper proposes a modified differential evolution (DE) approach for both discrete and real part of the UC problem. The infeasibility of the solutions is also handled by incorporating some repairing mechanisms in DE which forcefully satisfy the system constraints and speed up the search process. The experimentation is carried out on various standard and large power systems, starting from the 10-Unit base case and then going up to 100 units over a 24 hour time period. The obtained results indicate the effectiveness of the proposed approach as compared to the previous work reported in literature.

1. *University of Engineering and Technology, Taxila, Pakistan*

   *\*Corresponding author address: EED, UET Taxila, Pakistan*

   *Tel: +92 312 6231265, Email address:* [*nisma\_saleem.engr@hotmail.com*](mailto:nisma_saleem.engr@hotmail.com) [↑](#footnote-ref-1)
2. *University of Engineering and Technology, Taxila, Pakistan*

   *Address: EED, UET Taxila, Pakistan e-mail: Aftab.ahmad@uettaxila.edu.pk* [↑](#footnote-ref-2)
3. *University of Engineering and Technology, Taxila, Pakistan*

   *Address: EED, UET Taxila, Pakistan e-mail: salmanuett@yahoo.com* [↑](#footnote-ref-3)