

ADAPTIVE PSO BASED REAL CODED ALGORITHM FOR UNIT COMMITMENT

R. K. SANTHI S. SUBRAMANIAN

Professors of Electrical Engineering,
Annamalai University, Annamalaisagar-608002, Tamil Nadu, India

Abstract

This paper presents an adaptive PSO based technique that involves real number matrix representing generation schedule for unit commitment. The new generation scheme for initial population and the repairing mechanism attempt to reduce the overall computation time. The algorithm adaptively adjusts the inertia weight and the acceleration coefficients in order to enhance the search process. Numerical results on systems up to 100 generating units display the effectiveness of the proposed strategy.

Keywords: Unit commitment; particle swarm optimization.

Nomenclature

ACT	Average Computation Time
ED	Economic Load Dispatch
EPM	EP based Method
FLAPC	Full Load Average Production Cost
GAM	GA based Method
LRM	Lagrangian Relaxation Method
LRGAM	combined LR and GA based method
PSO	Particle Swarm Optimization
PA	Proposed Algorithm
UC	Unit Commitment
a, b, c	fuel cost coefficients
CST_i	cold start up cost of unit- i (\$)
c_1 & c_2	acceleration coefficients
$F(P_i^t)$	generator fuel cost function (\$/hr)
G	real number matrix
$G_{i,t}$	real power generation of unit i at hour- t
HST_i	hot start up cost of unit- i (\$)
K^{max}	maximum number of iterations
N	number of generating units
n	number of particles in the population
P_i^{min} & P_i^{max}	minimum and maximum real power generation of unit i respectively
P_i^t	real power generation of unit- i at hour- t
P^d_{load}	load demand at hour- t
R^t	spinning reserve at hour- t
r_1 & r_2	uniformly distributed random numbers in the range of [0,1]
ST_i^t	startup cost of unit- i at hour- t
T	total number of hours
T_i^{cold}	cold start hour of unit- i (hours)

Matlab Code For Pso Based Unit Commitment

**Suryanarayana Kajampady, Vinu
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Table of Contents Matlab Code For Pso Based Unit Commitment

1. Understanding the eBook Matlab Code For Pso Based Unit Commitment
 - The Rise of Digital Reading Matlab Code For Pso Based Unit Commitment
 - Advantages of eBooks Over Traditional Books
2. Identifying Matlab Code For Pso Based Unit Commitment
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Matlab Code For Pso Based Unit Commitment
 - User-Friendly Interface
4. Exploring eBook Recommendations from Matlab Code For Pso Based Unit Commitment
 - Personalized Recommendations
 - Matlab Code For Pso Based Unit Commitment User Reviews and Ratings

- Matlab Code For Pso Based Unit Commitment and Bestseller Lists
- 5. Accessing Matlab Code For Pso Based Unit Commitment Free and Paid eBooks
 - Matlab Code For Pso Based Unit Commitment Public Domain eBooks
 - Matlab Code For Pso Based Unit Commitment eBook Subscription Services
 - Matlab Code For Pso Based Unit Commitment Budget-Friendly Options
- 6. Navigating Matlab Code For Pso Based Unit Commitment eBook Formats
 - ePub, PDF, MOBI, and More
 - Matlab Code For Pso Based Unit Commitment Compatibility with Devices
 - Matlab Code For Pso Based Unit Commitment Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Matlab Code For Pso Based Unit Commitment
 - Highlighting and Note-Taking Matlab Code For Pso Based Unit Commitment
 - Interactive Elements Matlab Code For Pso Based Unit Commitment
- 8. Staying Engaged with Matlab Code For Pso Based Unit Commitment
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Matlab Code For Pso Based Unit Commitment
- 9. Balancing eBooks and Physical Books Matlab Code For Pso Based Unit Commitment
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Matlab Code For Pso Based Unit Commitment
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Matlab Code For Pso Based Unit Commitment
 - Setting Reading Goals Matlab Code For Pso Based Unit Commitment
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Matlab Code For Pso Based Unit Commitment
 - Fact-Checking eBook Content of Matlab Code For Pso Based Unit Commitment
 - Distinguishing Credible Sources

13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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