

Bijaya Ketan Panigrahi, Ajith Abraham, and Swagatam Das (Eds.)

Computational Intelligence in Power Engineering

Studies in Computational Intelligence, Volume 302

Editor-in-Chief

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Computational Intelligence in Power Engineering, 2010
ISBN 978-3-642-14012-9

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and Swagatam Das (Eds.)

Computational Intelligence in Power Engineering

 Springer

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ISBN 978-3-642-14012-9

e-ISBN 978-3-642-14013-6

DOI 10.1007/978-3-642-14013-6

Studies in Computational Intelligence

ISSN 1860-949X

Library of Congress Control Number: Applied For

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Typeset & Cover Design: Scientific Publishing Services Pvt. Ltd., Chennai, India.

Printed on acid-free paper

9 8 7 6 5 4 3 2 1

springer.com

Preface

Computational Intelligence (CI) is one of the most important powerful tools for research in the diverse fields of engineering sciences ranging from traditional fields of civil, mechanical engineering to vast sections of electrical, electronics and computer engineering and above all the biological and pharmaceutical sciences. The existing field has its origin in the functioning of the human brain in processing information, recognizing pattern, learning from observations and experiments, storing and retrieving information from memory, etc. In particular, the power industry being on the verge of epoch changing due to deregulation, the power engineers require Computational intelligence tools for proper planning, operation and control of the power system. Most of the CI tools are suitably formulated as some sort of optimization or decision making problems. These CI techniques provide the power utilities with innovative solutions for efficient analysis, optimal operation and control and intelligent decision making. Due to the nonlinear, interconnected and complex nature of Power System networks and the proliferation of power electronics devices (STATCOM, UPFC, TCSC etc), the CI techniques become the promising candidates for optimal planning, intelligent operation and automatic control of the power system. Neural Network (NN), Fuzzy logic (FL) as well as the derivative free optimization techniques like Genetic Algorithm (GA), Simulated Annealing (SA) and the Swarm Intelligence (SI) techniques like Particle Swarm Optimization (PSO), Ant Colony Optimization (ACO) play an important role in power industry for decision-making, modeling, and control problems. Due to the nonlinear nature of Power System networks and industrial electric systems (FACTS, HVDC etc), fuzzy logic and neural networks are promising candidates for planning, fault detection, automatic control, system identification, load and load/weather forecasting, etc. Distribution system routing and loss minimization are dealt with effectively using evolutionary algorithms and Swarm intelligence techniques.

This edited volume deals with different CI techniques for solving real world Power Industry problems. The technical contents will be extremely helpful for the researchers as well as the practicing engineers in the power industry.

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