

## C716083: MAJOR ELECTRICAL ENGINEERING

KEY WORD: OPTIMIZATION / PARALLEL PROCESSING / NEURAL NETWORKS

YUPAPORN JARUSIRIPHOT: SOLVING CONSTRAINED OPTIMIZATION PROBLEMS WITH NEURAL NETWORKS. THESIS ADVISOR: BOONMEE YANGTHARA, Ph.D. 121 pp. ISBN 974-635-263-6.

Instead of the conventional approaches, a new method for finding the extrema of a constrained optimization problem was proposed. Firstly, the problem was converted into an equivalent unconstrained problem, using the penalty function approach. And secondly, the penalty function was also further converted into an equivalent problem in the form of a set of ordinary differential equations with the forcing functions as functions of the conjugate gradients. Then, presented was a proof that the solutions of the set of the differential equations would converge to the extrema of the original constrained optimization problem. Casting the original optimization problem into a set of ordinary differential equations presented a great advantage in that it allowed parallel processing, via neural networks, in determining the solutions of the differential equations, thereby the extrema of the original optimization problem.

Digital simulations of the proposed method revealed that, in general, it resulted in more accurate results in a much shorter time when compared with a comparable method using the differential equations with the forcing as a function of the steepest descents.

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