

**Saber M. Saleh, Khaled H. Ibrahim, and Mahmoud B. Magdi Eiteba, “Economic aspects for multi-Step LC compensator with uncertain load characteristics using genetic algorithm” IET Generation, Transmission & Distribution, Vol. 10, Iss. 4, 10 March 2016, pp. 1075 – 1082.**

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### ملخص البحث الثالث

#### ملخص البحث باللغة الإنجليزية :

This study presents a method to consider the probabilistic nature of load impedance and harmonic currents by converting the conventional inductive–capacitive (LC) compensator into a multi-step type consisting of switchable units thus assuming that a single unit is not sufficient to ensure satisfactory results. The compensator steps are optimized based on economic criteria; minimising cost and maximising saving; in addition to cost-constrained performance criteria; maximising the power factor, minimising the transmission loss or minimising the voltage total harmonic distortion. The compensator values which would create resonance are constrained. Also the manufacturer's standard values for power shunt capacitors are considered. Genetic algorithm (GA) is used in the optimisation process plus numerical iterative method. GA is a search mechanism based on the principle of natural selection and population genetics. The contribution of the proposed procedure is demonstrated in examples taken from previous publications. Finally, simulated results show that the multi-step LC compensator provides a considerable improvement in the economics in case of probabilistic condition.