

**STATIC VAR COMPENSATOR PLANNING USING  
ARTIFICIAL IMMUNE SYSTEM FOR LOSS  
MINIMISATION AND VOLTAGE IMPROVEMENT**

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## **ABSTRACT**

Loss minimization in power system is an important consideration research issue. Transmission losses in a power system can be minimized by means of reactive power compensation. Installing Static Var Compensation (SVC) in a power system has known to be able to improve voltage level in the system and hence minimizing the system losses. This paper presents an Artificial Immune System (AIS) optimization technique to determine the size of the SVC in order to minimize loss in the system. The performance of this technique is tested using 14 buses IEEE Reliability Test System. The test result shows that the location and sizing of the SVC identified by the proposed technique has been able to improve voltage level of the system and also minimize the losses.

**Keywords:** Static Var Compensator (SVC), Artificial Immune System (AIS), loss minimization and voltage improvement.

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Background**

Most large power system blackouts, which occurred worldwide over the last twenty years, are caused by heavily stressed system with large amount of real and reactive power demand and low voltage condition. The low or voltage limit may be exceeded due to the voltage draining off VAR reserves [1]. When the voltages at system buses are low, the losses will also be increased. This study is devoted to develop a technique for improving the voltage profile and minimizing the system losses and hence eliminate voltage instability in a power system.

Many techniques of compensation were used by power system industries to minimize the losses and improve the voltage, such as On-load tap changing transformer (OLTC) and Static Var Compensator. Similarly, many technique of optimization have been in used for the past few years. These techniques are Linear Programming Dynamic Program, Generate Algorithm (GA) and Evolutionary Programming (EP). The purpose of this paper is to present a new technique for SVC planning using AIS technique in order to minimize the losses and improves the voltage profile in a power system.