INTRODUCTION

Technological innovations in soft computing techniques have brought automation capabilities to new levels of applications. Process control is an important application of any industry for controlling the complex system parameters, which can greatly benefit from such advancements. Conventional control theory is based on mathematical models that describe the dynamic behavior of process control systems. Due to lack in comprehensibility, conventional controllers are often inferior to the intelligent controllers. Soft computing techniques provide an ability to make decisions and learning from the reliable data or expert’s experience. Moreover, soft computing techniques can cope up with a variety of environmental and stability related uncertainties. This explores the different areas of soft computing techniques viz. Fuzzy logic, genetic algorithms and hybridization of two and abridged the results of different process control case studies. It is inferred from the results that the soft computing controllers provide better control on errors than conventional controllers. Further, hybrid fuzzy genetic algorithm controllers have successfully optimized the errors than standalone soft computing and conventional techniques. Exponential growth in soft computing technologies has marked new milestones in powerful representation, modeling paradigms and optimization mechanisms for solving modern controller issues. Soft computing has provided sophisticated methodology for the development of industrial process controllers. It is considered to be a state-of-art approach to artificial intelligence. With the emergence of high performance computing power, design engineers have applied artificial intelligence techniques to a wide spectrum of real-world problems in intelligent and autonomous control. Within the last decades, substantial amount of growth has been noticed on the application of soft computing techniques in engineering. The pervasive use of this technique in various engineering applications makes it an indispensible tool. The principal constituents of soft computing include theory of neurons, fuzzy logic, evolutionary computing, genetic algorithms, chaotic systems and probabilistic reasoning. Out of which the two emerging techniques viz. fuzzy logic and genetic algorithms are considered in this research work to control the process of the systems. Soft computing techniques have been recognized as attractive alternatives to the standard, well established hard computing paradigms. Soft computing is still in its initial stages of crystallization. Soft computing techniques, in comparison with hard computing employ different methods which are capable of representing imprecise, uncertain and vague concepts.
Induction motors are the most widely used motors for industrial control and automation; hence, they are also called the workhorse of the motion industry. They are robust and reliable. When power is supplied to an induction motor at the recommended specifications, it runs at its rated speed. But many applications need variable speed operations. For example, a washing machine may use different speeds for each wash cycle. Induction motor Speed control is complex due to its nonlinear characteristics. There are two types of controlling speed of induction motor these are scalar control and vector control. Several studies have been carried out in the field of speed control system, but scalar speed control system shows simple structure by low steady state error. The constant V/f scalar control system is considered for study. Variable Voltage Variable Frequency (VVVF) or V/f is the most common method of speed control in open loop approach. This method is most suitable for applications without position control requirements or the need for high accuracy of speed control.