ABSTRACT

Development in technology led to increasing demand for high power switched mode converters in telecommunication equipment’s, satellite and so on. A DC/DC converter generally needs to work under high switching frequency when used as an adjustable power supply to reduce the size of magnetic elements such as inductors, transformers and capacitors, but with the rising of the switch frequency, the switch losses will increase, with increase in output voltage ripple and the reduction in efficiency of the converter. Ripple voltage is a small unwanted residual periodic variation of the Direct Current (DC) output of a power supply which is undesirable in many electronic circuit applications which tends to undesired noise in audio and video applications there by dropping their performance. Recent studies in reducing this output voltage ripple content focus on two distinct fields: one is various topologies and the other one is various controlling techniques employed for these topologies. In past few decades several DC – DC converter topologies have been proposed to address this issue, namely CuK converter, SEPIC converter, Zeta converter, Luo converter and so on. Despite of various techniques such as Equivalent Series Resistance (ESR), Inductor-Capacitor (LC) filter, Automatic Loop Bandwidth (ALB) control, voltage lifting technique, inductor coupling, capacitor coupling and several other techniques that have been employed to reduce the output ripple content, yet the mitigation of output voltage ripple is not desirable.
Due to inductance and capacitance effects the DC – DC converters tend to be non-linear during load and line variations in operating conditions. To sustain this non-linear controlling technique is desirable over linear control technique such as Proportional-Integral (PI) control, Proportional-Integral-Derivative (PID) control and Sliding Mode Control (SMC). The non-linear controlling techniques namely Fuzzy Logic Control (FLC), Neural Network (NN) control, Neuro Fuzzy (NF) control, Genetic Algorithm, Particle Swam Optimization (PSO), Cuckoo search and numerous other control techniques can be employed to endure the inductance and capacitance effects.

In this thesis a switched converter named two-stage KY converter, known for low output ripple content against its antecedent, yields less amount of ripple in few hundred milli volts is being controlled by Neuro-Fuzzy logic controller to produce a very low output ripple content with fast transient response. In this work Neuro-Fuzzy controlling technique is being designed and employed for output voltage ripple reduction of two-stage KY converter whose result of ripple reduction is more obvious. The result obtained from simulation proves that two-stage KY converter exhibit rapid settling time and load transient.