Multi Output Switched Capacitor based DC-DC Converter for Low Voltage Applications

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Abstract. This research paper outlines the single input multi output(SIMO) switched capacitor based DC-DC converter is used for low power integrated circuit (IC) applications. The DC power source is essential for running the electronics equipment and its integrated circuits embedded for low power applications. The most popular kind of DC-DC converters are switched capacitor converters (SCC). A DC-DC converter's function is to convert an inadequately specified or fluctuating supply of DC voltage into a predetermined and steady output voltage for the applications. It goes without saying that designing an SCC with a significant quantity of target voltages spaced at high precision throughout the area of interest and thus increasing efficiency is both required and tremendously useful. At present, SCC topologies with binary resolution are given special emphasis. This work presents a single input multi outputs (SIMO) switched capacitor convertor topology that uses a minimal amount of switches and capacitors. Thirteen dual output voltage conversion ratios are delivered by the proposed multi output SCC without the need of any magnetic components like inductors or transformers. The PSIM software tool is utilised to validate the simulation findings of the proposed SIMO SCC.

1. Introduction

The growth of Internet of Things (IoTs) depends on small power circuits and devices have been facilitated by advancements in CMOS technology. Low power gadgets are distinguished by their small form factor and extended battery life. To ensure extended battery life, low-power gadget efficiency and battery capacity should be enhanced. Battery capacity advancements have been moderate over the previous decade, at about 7% each year which is insufficient to sustain a device's extended lifespan. As a result, circuit designer has concentrated on minimizing power consumption in order to achieve a long lifespan with the given battery capacity.