

Research Migration Project

National Institute of Technology Rourkela

Name of the participant : Krishnendu Roy

Title of the circuit : Study of R2R 4-Bit and 8-Bit DAC Circuit using eSim

Theory/Description :

The R-2R ladder Digital-to-Analog Converter (DAC) is a widely used and cost-effective method for digital-to-analog conversion, utilizing a resistor network arranged in a ladder structure. This project focuses on the research migration of 4-bit and 8-bit R-2R DAC circuits using eSim, an open-source EDA tool developed by FOSSEE, IIT Bombay. The primary objective is to design, simulate, and analyze the performance of these DAC circuits while comparing theoretical calculations with simulated results.

Key performance metrics such as resolution, output voltage accuracy, and linearity are evaluated to assess the effectiveness of eSim in modeling R-2R DAC behavior. The results demonstrate that eSim provides reliable simulation accuracy while offering advantages like ease of design modification, cost reduction, and accessibility. By successfully migrating the R-2R DAC circuit to eSim, this project enhances the open-source electronics design ecosystem and serves as a valuable resource for researchers and students in digital-to-analog conversion studies.

Circuit Diagram(s) :

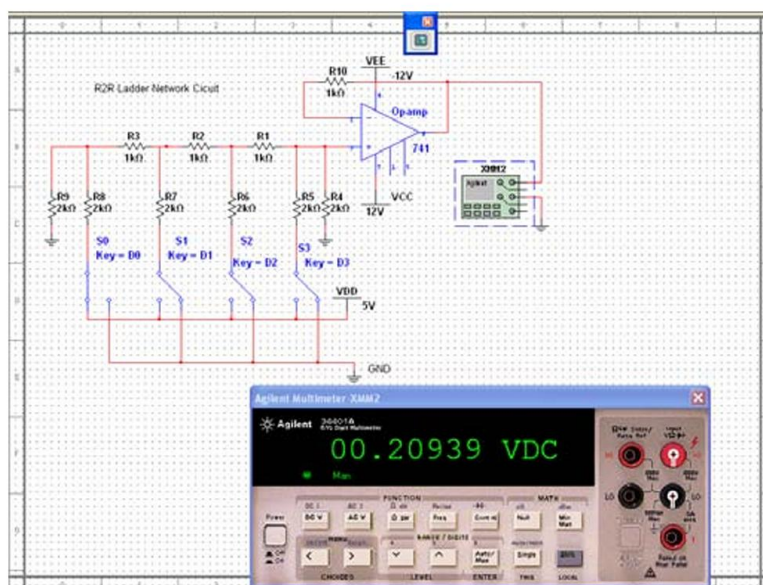


Figure 5: Schematic Diagram of 4bit DAC and output.

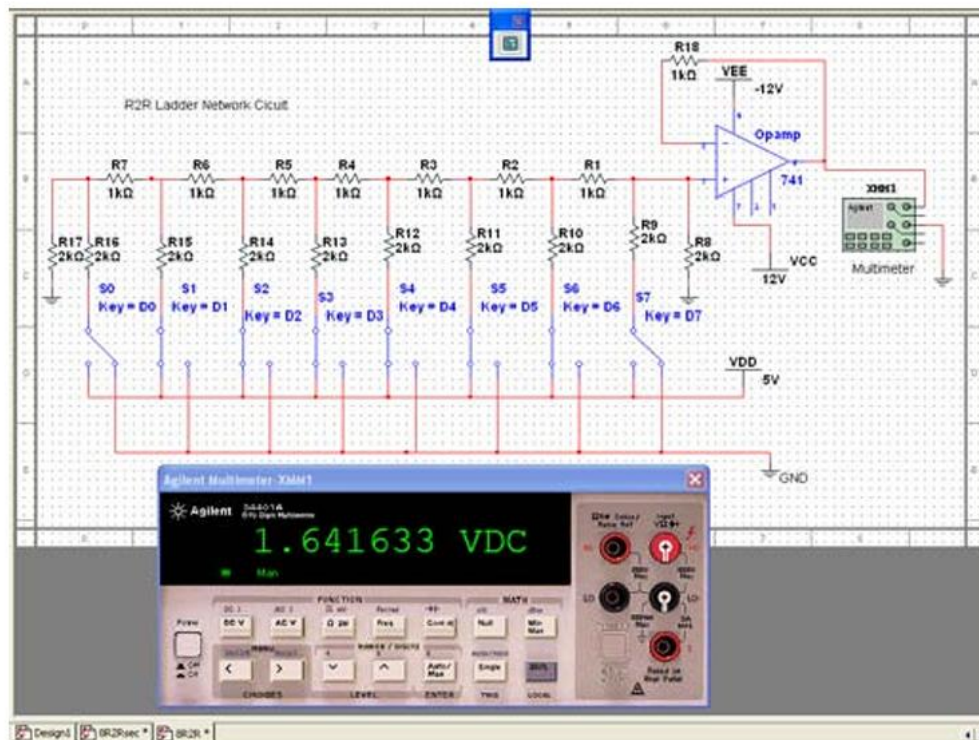


Figure 7: Schematic diagram of 8bit DAC 126^{th} case output

Source/Reference(s) :

Title of Paper: Study of R2R 4-Bit and 8-Bit DAC Circuit using Multisim Technology

Link to paper: [Study of R2R 4-Bit and 8-Bit DAC circuit using Multisim Technology](#)