**ROBA MULTIPLIER: A ROUNDING-BASED APPROXIMATE MULTIPLIER FOR HIGH-SPEED YET ENERGY-EFﬁCIENT DIGITAL SIGNAL PROCESSING**

**Abstract**

In this paper, we propose an approximate multiplier that is high speed yet energy efﬁcient. The approach is to round the operands to the nearest exponent of two. This way the computational intensive part of the multiplication is omitted improving speed and energy consumption at the price of a small error. The proposed approach is applicable to both signed and unsigned multiplications. We propose three hardware implementations of the approximate multiplier that includes one for the unsigned and two for the signed operations. The efﬁciency of the proposed multiplier is evaluated by comparing its performance with those of some approximate and accurate multipliers using different design parameters. In addition, the efﬁcacy of the proposed approximate multiplier is studied in two image processing applications, i.e., image sharpening and smoothing.

**TOOLS:**

1. **XilinxISE 14.7**

**LANGUAGE:**

1. **VerilogHDL**