Figure 2: Simulation Results

Figure 3: Compressed Image

5. Computational Complexity and Performance Analysis

We consider the arithmetic complexity as figure of merit for estimating the computational complexity. The arithmetic complexity consists of the number of elementary arithmetic operations (additions /subtractions, multiplications/divisions, and bit shift operations) required to compute a given transformation.

In the context of image compression, the complexity of the diagonal matrix can be absorbed into the quantization step, therefore the diagonal matrix does not contribute towards an increase of the arithmetic complexity [9]. The peak signal to noise ratio (PSNR) is taken as parameter for performance measures. We get average PSNR=27.2087 dB at a compression ratio of 50%. The figure 3 shows the resulting compressed Leena image obtained from the above described procedure for 50% compression ratio.

6. Conclusion

In this paper, we proposed a low-power 8-point DCT approximation that requires only 14 addition operations. The hardware architecture for the proposed transform is implemented in VHDL. The proposed transform offers low arithmetic complexity.

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