

Abstract

The direct digital synthesizer (DDS) is an increasingly popular method for frequency generation. Applications for the DDS range from communications to radar systems to electronic warfare. In this work several methods for implementing the phase to frequency conversion in the DDS are explored. The methods include a direct lookup table (LUT), quantization and dithering with a decreased size LUT, and algorithms such as the CORDIC and the adaptive CORDIC algorithms. The methods are compared by the resulting spurious content in the spectrum and phase noise in the signal. Further error corrections are applied to the CORDIC and adaptive CORDIC algorithms. For low bit systems these corrections provide a small improvement in spurious frequency content and phase noise in the output signal over the standard algorithms.