INTERPOLATION OF MICROCONTROLLER ADC BY SELF-INDUCED DITHERING

L. E. Bengtsson
Department of Physics
University of Gothenburg
SE-41296 Gothenburg, Sweden
Emails: lars.bengtsson@physics.gu.se

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Abstract- The resolution of ADCs (Analog-to-Digital Converters) can be improved by dithering, i.e. by intentionally injecting white noise into the analog signal. This work describes the theory behind dithering, how to optimize the magnitude of the noise and also a design that illustrates how dithering can be implemented to increase the resolution of a microcontroller's ADC. In order to demonstrate the potential of the design, the resolution of the 10-bit ADC of a PIC18F458 microcontroller is increased to 12 bits by dithering. This is possible by oversampling and decimation. The great advantage of the proposed design is that the noise is generated by the microcontroller itself, obviating the need of an external noise source.

Index terms*:* ADC, dithering, resolution, microcontroller, quantization, noise.