Abstract

Software defined radio has find important place in modern communication systems where majority of signal processing is performed in the digital domain using programmable DSPs. Digital down conversion (DDC) is one of the core technologies in SDR, as well as an important component of digital intermediate frequency receiver system. DDC use CIC decimation filters for sample rate decimation. CIC decimation filters require less computation but large passband droop occurs in the frequency response. This paper presents a simple design of compensation FIR filter for CIC decimation filter which will correct the passband droop. Compensation filter design consists of polynomial based design of FIR filter which are used in cascade with CIC filter. As proposed filter depends on simple transformation less approach and computation is required. The resulting structure is multiplier less and exhibits small passband droop in comparison to CIC filter. It modifies the frequency response of CIC decimation filter while maintaining the linear phase.

References

- Eugene B, Hogenuer, 1981” An economical class of digital filter for decimation &

- Altera’s application note 455 April 2007, “Understanding CIC compensation filter” ver. 1.0.


- Gordana Jovanovic Dolecek and Fernando Javier Trejo Torres. “Compensated CIC cosine Decimation filter”.


- Vinay Kumar and Sunil Bhooshan, 2006 “Designing FIR Filters with Polynomial Approach”, World Academy of Science,Engineering and Technology vol.22..


- L.Lundheim and T.A. Ramstad,1999 “ An efficient and flexible structure for decimation and sample rate adaptation in software radio receivers, Proceedings of the Fourth ACTS Mobile Communications Summit (AMOS), Sorrento, Italy.


Polynomial based Design of CIC Compensation Filter used in Software Defined Radio for Multirate Signal Processing

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