ECE Final PhD Defense

GINEERING

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> Generalized Noise Shaping in Delta Sigma Modulators

Friday, April 10th, 2020 1:30 pm – 3:30 pm • REMOTE: <u>Zoom</u>

Chair: Professor Michael P. Flynn



Electrical and Computer

Engineering

Abstract:

Ever increasing bandwidth demands in modern cellular networks are becoming difficult to meet, as there is no longer room to expand within the current commercial frequency allocation. As a result, an important part of current and future cellular protocols, such as LTE-A and 5G, is the ability to communicate on multiple channels at once. However, when those channels lie in separate bands, they can be separated by 100's of MHz. This complicates the analog front-end design, since it is difficult for a single ADC to convert such a wide bandwidth, to say nothing of the inefficiency of converting undesired spectrum along with desired. This means multiple, power-hungry front-ends are typically required.

In the interest of reducing the need for separate analog front-ends, we introduce the first Multi-Band Δ Σ ADC. Using custom-designed noise shaping, it is able to digitize multiple bands simultaneously without wasting valuable noise shaping resources on undesired portions of the spectrum.