Hamilton Institute

On the Design of Doubly-Generalized Low-Density Parity-Check Codes

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Abstract:
Doubly-generalized low-density parity-check (D-GLDPC) codes offer an attractive compromise between algebraic and random code design philosophies. In this talk we introduce the concept of D-GLDPC codes,and then provide a solution for the asymptotic growth rate of the weight distribution of any D-GLDPC ensemble. This tool is then used for detailed analysis of a case study, namely, a rate-1/2 D-GLDPC ensemble where all the check nodes are (7,4) Hamming codes and all the variable nodes are length-7 single parity-check codes. It is illustrated how the variable node representations can heavily affect the code properties and how different variable node representations can be combined within the same graph to enhance some of the code parameters. The analysis is conducted over the binary erasure channel. Interesting features of the new codes include the capability of achieving a good compromise between waterfall and error floor performance while preserving graphical regularity, and values of threshold outperforming LDPC counterparts.

Venue: Seminar Room, Hamilton Institute, Rye Hall,
        NUI Maynooth

Time: 2.00 - 3.00pm (followed by tea/coffee)

Travel directions are available at www.hamilton.ie

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