1046-94-841 **Mark F. Flanagan*** (mark.flanagan@ieee.org), Department of Mathematics, University of Zurich, Winterthurerstrasse 190, CH-8057 Zurich, Switzerland, **Enrico Paolini** (e.paolini@unibo.it), DEIS, University of Bologna, via Venezia 52, 47023 Cesena (FC), Italy, **Marco Chiani** (marco.chiani@unibo.it), DEIS, University of Bologna, via Venezia 52, 47023 Cesena (FC), Italy, and **Marc P.C. Fossorier** (mfossorier@ieee.org), ETIS ENSEA / UCP / CNRS UMR-8051, 6, avenue du Ponceau, 95014 Cergy Pontoise, France. *On the Growth Rate of the Weight Distribution of Irregular Doubly-Generalized LDPC Codes.*

Low-density parity-check codes (LDPC codes) are a class of high-performance error correcting codes first introduced by Gallager in the 1960s. The asymptotic growth rate of the weight distribution of LDPC and related codes is a topic whose study dates all the way back to this early time in coding theory. In this talk, we derive an expression for the asymptotic growth rate of the number of small linear-weight codewords of irregular doubly-generalized LDPC (D-GLDPC) codes. The expression is compact and generalizes existing results for LDPC and generalized LDPC (GLDPC) codes. In the case where there exist check and variable nodes with minimum distance 2, it is shown that the growth rate depends only on these nodes, and the important parameter

$$\frac{1}{P^{-1}(1/C)}$$

is identified which discriminates between an exponentially small and an exponentially large expected number of small linear-weight codewords. An important connection between this new result and the stability condition of D-GLDPC codes over the BEC is highlighted. Such a connection, previously observed for LDPC and GLDPC codes, is now extended to the case of D-GLDPC codes. (Received September 12, 2008)