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Enumerating Pseudo-codewords in Fundamental Cones.

The nature of the message passing decoding algorithm suggests that pseudo-codewords are critical in studying the performance of parity check codes. Koetter, Li, Vontobel and Walker showed in their paper that pseudo-codewords are the integer points congruent to codewords modulo 2 in the fundamental cone. In this paper it is shown that the generating function of the pseudo-codewords $\sum_{\mathbf{p}} \mathbf{x}^{\mathbf{p}}$ is rational. Besides the generating function some other rational functions recording pseudo-codewords are also given. To obtain the explicit form of these functions the structure, especially the generators, of the fundamental cones must be known. As such, the generators of fundamental cones are exhibited for some special parity check matrices. (Received September 15, 2008)