1035-94-1131    **Sarah L Sweatlock\*** (`sarah@acm.caltech.edu`), MC 136-93, Pasadena, CA 91125, and **Srinivas Aji** and **Robert J McEliece**, MC 136-93, Pasadena, CA 91125. *On the Taylor Series of Asymptotic Weight Enumerators.*

One of the most important research areas in coding theory is weight enumeration, which attempts to calculate or estimate the number of words of a given weight in a code, or average number of words of a given weight in an ensemble of codes. Because these numbers tend to be quite large, we often focus on the logarithm of the weight enumerator, which is sometimes called the spectral shape. We show that, in general, if a code ensemble has a dual minimum distance $d^\perp$, the first $d^\perp$ derivatives of the spectral shape at its maximum point will match the first $d^\perp$ derivatives of the entropy function at its maximum point. To prove this, we demonstrate that the convex hull of the spectral shape is the Legendre transform of the logarithm of the asymptotic moment generating function, which is related to the entropy function through the Pless Power Moment Identities. (Received September 18, 2007)