RADEMACHER'S COEFFICIENTS AND RESTRICTED PARTITIONS

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ABSTRACT. The partial fraction decomposition

$$\prod_{j=1}^{N} \frac{1}{1-q^j} = \sum_{\substack{0 \leqslant h < k \leqslant N \\ (h,k)=1}} \sum_{\ell=1}^{\lfloor N/k \rfloor} \frac{C_{hk\ell}(N)}{(q - e^{2\pi i h/k})^\ell}$$

defines the coefficients $C_{hk\ell}(N)$. As Andrews noted, their study should lie somewhere between q-series and modular forms. This talk describes recent and in-progress work on getting a better understanding of these mysterious numbers $C_{hk\ell}(N)$ and resolving conjectures about them due to Rademacher, Sills and Zeilberger.