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FUSS-CATALAN AND RANEY DISTRIBUTIONS VERSUS PRODUCTS  
OF RANDOM MATRICES

We explicitly find positive measures  $P_s(x)$  whose  $n$ -th Hausdorff power moment is the sequence of Fuss-Catalan numbers, defined by  $FC_s(n) = \frac{1}{sn+1} \binom{sn+n}{n}$ , with  $s = 1, 2, \dots$  and  $n = 0, 1, \dots$ . Two-parameter generalization of Fuss-Catalan numbers, the Raney numbers are defined by  $R_{r,k}(n) = \frac{k}{rn+k} \binom{rn+k}{n}$ ,  $r = 1, 2, \dots$ ,  $k = 1, 2, \dots$  and  $n = 0, 1, \dots$ . We explicitly find positive measures  $W_{r,k}(x)$  whose  $n$ -th Hausdorff moment is the sequence  $R_{r,k}(n)$ . We discuss analytically and graphically these measures and demonstrate that  $P_s(x)$  generalize the Marchenko-Pastur distribution, and  $W_{r,k}(x)$  is a natural extension of Wigner's semicircle law, both characterizing different forms of products of random matrices.

This is joint work with Karol Życzkowski.