

# Asymptotic enumeration of 0-1 matrices: the sparse case

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## Abstract

Given two vectors of positive integers with the same sum, how many different zero-one matrices are there with row sums given by the first vector and column sums given by the second vector? This is a fundamental question with many applications. Exact expressions seem unlikely to exist, so we seek highly accurate asymptotic expressions. (Here the input is a sequence of row sums and a sequence of column sums, such that the matrix sum tends to infinity.)

Different methods are used for asymptotic enumeration depending on whether the matrices are sparse (small matrix sum) or dense (fairly large matrix sum). This talk will discuss the sparse case, where combinatorial arguments such as the switching method are employed. (See also Brendan McKay's talk for the dense case, where contour integrals are used). We also discuss the asymptotic enumeration of sparse nonnegative integer matrices, which involved some recycling of calculations from the enumeration of sparse zero-one matrices.