Some Enumerative Problems Of $(0,1)-$Matrices

Shanzhen Gao[1], Zhonghua Tan[2]
1 Department of Mathematical Sciences, Florida Atlantic University, Boca Raton, FL 33431, e-mail: sgao2@fau.edu

2 Guangdong University of Technology, Guangzhou, 510090, China

Let $f(m,n,s,t)$ be the number of $(0,1)$ - matrices of size $m \times n$ such that each row has exactly s ones and each column has exactly t ones ($sm = nt$). How to determine $f(m,n,s,t)$? As R. P. Stanley observes (Enumerative Combinatorics I (1997), Example 1.1.3) the determination of $f(m,n,s,t)$ is an unsolved problem, except for very small s, t. We will present some rather involved closed formulas for $f(m,n,s,t)$ $(2 \leq s \leq 6, 2 \leq t \leq 4)$.