ON RESTRICTED WORDS AND COLORED COMPOSITIONS

DANIEL BIRMAJER

ABSTRACT. We consider binary strings of the form 1, 10, 100, . . . , as building blocks for families of binary words that we utilize to enumerate compositions and restricted words over a finite alphabet. Our approach allows us to generalize and address in a systematic manner previous results in the subject. Regarding compositions of positive integers, we look at two families of coloring sequences and give closed formulas for the corresponding number of colored compositions with a prescribed number of parts. For a given integer $\alpha \geq 0$, we give formulas for the $\binom{n+\alpha}{n-1}$-color compositions of n, generalizing existing results for n-color and $\binom{n+1}{2}$-color compositions. We also consider compositions of n colored by the Fuss-Catalan numbers. The results presented in this paper rely on the invert transform and its representation in terms of partial Bell polynomials.

DEPARTMENT OF MATHEMATICS, NAZARETH COLLEGE, 4245 EAST AVE., ROCHESTER, NY 14618