1172-60-20 **Mark Mixer*** (`mixerm@wit.edu`), **Samuel Gutmann** and **Steven Morrow**. *Conditional probability of derangements and fixed points.*

Consider a random permutation on the integers $[1,\ldots,n]$. Given that there are d fixed points in the first k points, what is the probability that $(k+1)$ is fixed? Call this probability $f(n,k,d)$. Using the inclusion-exclusion principle, it is straightforward to show that $f(n,k,0) = 1 - \frac{\sum_{j=0}^{k+1}(-1)^j\binom{k+1}{j}(n-j)!}{\sum_{j=0}^{k}(-1)^j\binom{k}{j}(n-j)!}$. However, this does not provide much intuition for the behavior of f.

In this talk we will provide some results related to this conditional probability function, in particular showing that it is a decreasing function of k except when $n=3$ and a decreasing function of n except when $k=1$. (Received July 30, 2021)