

Proof. A monotone path can be encoded by a binary word, where 1 stands for “a step to the right” and 0 stands for “a step upwards”. In order to attain the point (k, l) , we need to make k steps to the right and l steps upwards. Therefore the monotone paths from $(0, 0)$ to (k, l) correspond to words of length $k + l$ containing exactly k digits 1. From Theorem ?? we know that the number of such words is $\binom{k+l}{k}$. \square