

Difficulty: 0/4 **Interest:** 1/4

Jeremy Kun gives a canonical bijection between $\binom{n+1}{2}$ and a discrete triangle of length n , as seen below.

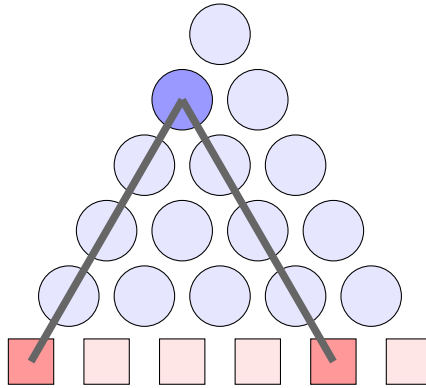


Figure 1: Bijection that maps a point on the triangle with side length 5 to a 2-subset of $[5 + 1]$.

Question. Is there a similar “projection” that bijects a point on the discrete tetrahedron to a 3-subset of $[n + 2]$?

Note. Misha Lavrov gives a potential function to the question on Math Stack Exchange.

Related.

1. More generally is there a bijection from the k -simplex to a k -subset of $[n + k - 1]$?

References.

<https://jeremykun.com/2011/10/02/n-choose-2/>

<https://math.stackexchange.com/a/2468687/121988>