Segregation project 2017

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1 Introducion

2 Definitions

Generation A generation is a sequence of turns in which every individual is selected once.

Equilibrium A board X has reached equilibrium after n generations if, in the $n+1$th generation, no one has moved.

3 Proof of equilibrium

Theorem For an 8×8 board with 20 characters of type 1 and 20 characters of type 2, happiness rule of $1/3$, and displacement to the nearest spot with greater happiness (if it exists), an equilibrium will always be reached.

Proof. Let an 8×8 board be given and randomly placed individuals. If there is equilibrium, there is nothing to prove. So assume there is no equilibrium. Then there is an individual i with happiness$h := (x_i, y_i, \text{type}(i)) < 1/3$ and there is a spot $(x, y) \in X$ with happiness$(x, y, type(i)) > h$. □