Single arithmetic Crossover

- Parents: $(x_1 \dots x_n)$ and $(y_1 \dots y_n)$
- Select a single gene (k) at random
- children are created

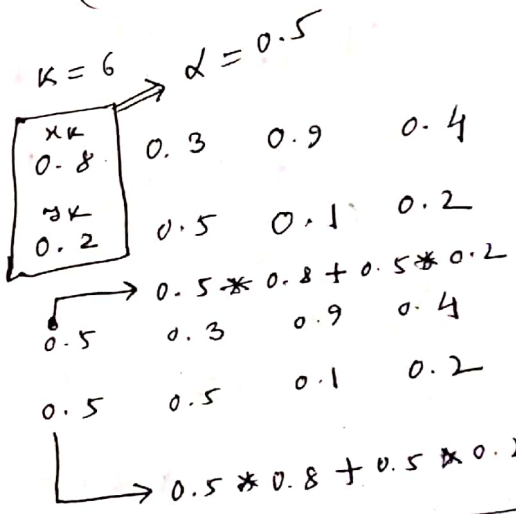
child1: $x_1 \dots x_{k-1}, \alpha \cdot y_k + (1-\alpha) x_k, \dots x_n$

child2: $y_1 \dots y_{k-1}, \alpha \cdot x_k + (1-\alpha) y_k, \dots y_k$

Example:

Parents
- X: 0.5 0.7 0.7 0.5
- Y: 0.1 0.3 0.1 0.3

children
- c1: 0.5 0.7 0.7 0.5
- c2: 0.1 0.3 0.1 0.3



Whole arithmetic Crossover

- Most commonly used
- Parents: $x_1 \dots x_n$

  $y_1 \dots y_n$
- Children are created

child1: $\alpha \cdot \bar{x} + (1-\alpha)\, \bar{y}$

child2: $\alpha \cdot \bar{y} + (1-\alpha)\, \bar{x}$

For example:

simple arithmetic Crossover

- Parents:

  $x_1 \dots x_n$

  $y_1 \dots y_n$
- Pick random gene k after this point mix values
- children are created

child1:

$x_1 \dots x_k, \alpha y_{k+1} + (1-\alpha) x_{k+1}, \dots$

$\alpha y_n + (1-\alpha) x_n$

child2:

$y_1 \dots y_k, \alpha x_{k+1} + (1-\alpha) y_{k+1}, \dots$

$\alpha x_n + (1-\alpha) y_n$