

procedure SGA( $f : \mathbb{X} \mapsto \mathbb{R}^+$ ,  $ps$ ,  $cr$ )

▷ for maximization!

for  $j \in 1 \dots ps$  do ▷ random initial population  
randomly sample  $S_0[j].x$  from  $\mathbb{X}$ ;  $S_0[j].y \leftarrow f(S_0[j].x)$ ;

for  $i \in 0 \dots \infty$  do ▷ iterate “generations”  
for  $j \in 1 \dots ps$  do ▷ new pop. via mutation and crossover  
if  $\mathfrak{R}_0^1 < cr$  then  $N_i[j].x \leftarrow \text{binary}(S_i[\lfloor \mathfrak{R}_i^{ps} \rfloor].x, S_i[\lfloor \mathfrak{R}_i^{ps} \rfloor].x)$ ;  
else  $N_i[j].x \leftarrow \text{move}(S_i[\lfloor \mathfrak{R}_i^{ps} \rfloor].x)$ ;  
 $N_i[j].y \leftarrow f(N_i[j].x)$ ;

$S_{i+1} \leftarrow$  *Roulette Wheel*: select  $ps$  records from  $P_i = S_i \cup N_i$   
such that, for each of the  $ps$  slots, the probability  
of  $P_i[j]$  to be chosen is **proportional to  $P_i[j].y$** .