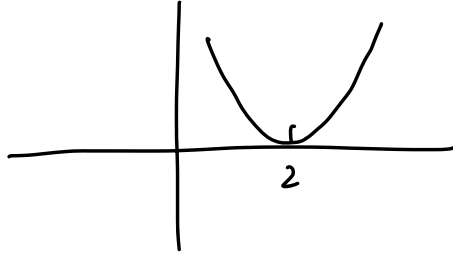


Example of simulated annealing

Q minimize  $f(x) = (x-2)^2$



Solution ① initial solution  $x=8$

$$f(8) = 36$$

② initial temperature

$$T = 10$$

③ cooling rate 0.9

after each iteration

$T$  is multiplied by 0.9

④ candidate moves

⑤ Acceptance rule

if  $\Delta f < 0$  accepted.

if  $\Delta f > 0$  accepted probability

$$p = e^{\frac{-\Delta f}{T}}$$

(6)

iteration	current x	f(x)	T	Candidate Move	Candidate x	f(candidate)	$\Delta f$	Acceptance Decision	New x	New T
0	8	36	10						8	10
1	8	36	10	-0.8	7.2	27.04	-8.96	low ✓	7.2	9
2	7.2	27.04	9	-0.5	6.7	22.09	-4.95	low ✓	6.7	8.1
3	6.7	22.09	8.1	+0.8	7.5	30.25	+8.16	$e^{\frac{-8.16}{8.1}} \approx 0.364$ generate random number $0.3 < 0.364$ ✓	7.5	7.29
4	7.5	30.25	7.29	-1	6.5	20.25	-10	low ✓	6.5	6.56
5	6.5	20.25	6.56	+0.4	6.9	24.01	+3.76	$e^{\frac{-3.76}{6.56}} = 0.564$ random $0.7 > 0.564$ Reject	6.5	5.9049