f(0): (10.3)2: (7)249 indust math unfort boundom say Objective function () of objective - function (1) return (x;3) * * d July 12 (8 2) 6 x 3 des simulated arricating conjective surction, is, itemp, cooling rate, at the ations)

cooling rate, at 110

cooling rate, at 110 cuvient val = Objective function (x, current sof) 1/99 - 1000 pent -001 = current 60 pens - Julio : sulu : movemos best - val = convient . val temp = itemp 111000 miles. Instrum = miss . Fred while iterations & maxiferation and temp > stopping took then generate a new value by taking a sandom value and adding to current sol in med since ns: current. sol + random curiform (=1,11) minusis.

du: new-val-current value morning: minusis. of durcontinues - con one may when in which were If du dinegation it means therew adultion has a lower value which makes it herfore for minungation () whole in minung a minulaid - Thereuse current-601 = new-splan costra sulle - marines current val < new, voil ell if the new solution is knowed don't accept Next check if the solution found is the rest one if convert val thist. I'll best. Ed = comment. do! bust val aurent val out of when inchine he Invunement the iterations was a missible that values: is=10 decrease the tench max iforation: 10 by s. 1. and remained atopling romp : 1e.8 temp: temp + 100 itemp = 1000 woung-rate coolerig rate: 0.95

import math import random def objective-function (x): de simulated-annealing cobjective-function, initial de simulated-annealing cobjective-function, initial similar exemperature, cooling-rate, atophing-temperature man - uterations): current_aulution: unitial-aulution auvent value: Objective - function (uvilent - socution) best-balution = auvient-dolution best-value = coverent-value dempurature: initial tempurature iferation: 0 while temperature 7 storping - temperature and ateration (max - iteration : new_solution: current_siteition + sandom.uniform(, new value z objective - punchion (new-solution) detta-Value: new-value-current_Value y delta-value(0: current - Dalution = new- Tolution current-value = new-value an: frobability much ench (- delta valuel tempush in sandorn. roundom() < fuerbability: coverent-solution: new. Solution /current_value = new-value if avvicur-value L best-value: best- whiten = current - whiten best-value; current-value temperature: temperature * cooling rate Best accurion: & best solution éteration + : 1 fruit (f'akration: & iteration), temperature: Etemperature: Etemperature

return lest_aboution, best_value initial audunion: 10 initial itemperature: (000 cooling-ran: 0.95 stopping demperature: 1c. 8 max. iterations: 10 bust-solution, best-value : Bimulated Conneaung Colycotive. Junction, initial adution, initial-temperature, wolung-race, stopping -temperature, max iterations) part (f "best solution", g(x): Elest-value: 4, 63") authut: iteration: 1 Tempurature: 950.0000, leveent 8061:9.4775 iteration: 2 Tempuraturu: 902.0000 Curruntson: 9-5096 temperature: 857.3750 eurrent soly: 9.6366 iteration: 3 iteration: 4 Temperarure: 814,5062 current son: 10.4510 Temperature: 7.73.7809 lurren San: 10.1823 attration:5 iferention: 6 Temperature, 725.0918 awaren 80cm. 10,1569 iteration: 7 Temperature: 698.337 auviere 304, 110.6004 tempurature: 663.4204 aurrent 8061: 10.993 i boration: 8 iteration: 9 Tempurature: 630.2494 (evolunt Soly: 10.8792 iteration:10

Best duln: 9.475315 Bust ducn : 9. 475315 Best duch : 9.4 \$5318 Best doch: 9-475315 821.0/24 Best duch : 9. 475315 Best duch : 9. 475315

Best Suln: 9.475315 Bust doln: 9. 475315 Bust doen: 9.475315

Best ducn: 9-475315

Temperature :598.7369 Ceverent Soin:11.7439

```
Iteration: 1, Temperature: 950.0000, Current Solution: 9.0679, Best Solution: 9.0679
Iteration: 2, Temperature: 902.5000, Current Solution: 8.8516, Best Solution: 8.8516
Iteration: 3, Temperature: 857.3750, Current Solution: 8.2633, Best Solution: 8.2633
Iteration: 4, Temperature: 814.5062, Current Solution: 8.9662, Best Solution: 8.2633
Iteration: 5, Temperature: 773.7809, Current Solution: 8.7553, Best Solution: 8.2633
Iteration: 6, Temperature: 735.0919, Current Solution: 9.6547, Best Solution: 8.2633
Iteration: 7, Temperature: 698.3373, Current Solution: 10.4229, Best Solution: 8.2633
Iteration: 8, Temperature: 663.4204, Current Solution: 11.1426, Best Solution: 8.2633
Iteration: 9, Temperature: 630.2494, Current Solution: 11.1426, Best Solution: 8.2633
Iteration: 10, Temperature: 598.7369, Current Solution: 11.3777, Best Solution: 8.2633
Best solution found: x = 8.2633, f(x) = 27.7021
```