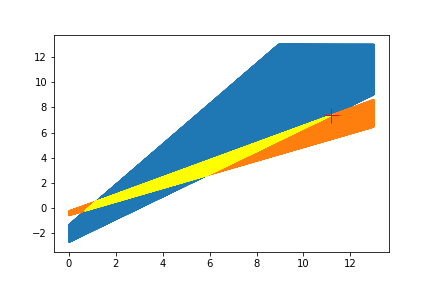
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import matplotlib.pyplot as plt

import numpy as np

import math

import random

%matplotlib inline

def res1(x):

a = max(x[0], x[1]) >= 0

b = 5\*x[0] - 4\*x[1] - max(2\*x[0], 1\*x[1]) \* 0.7 <= 10.8

c = 5\*x[0] - 4\*x[1] + max(2\*x[0], 1\*x[1]) \* 0.7 >= 5.2

return a and b and c

def res2(x):

a = max(x[0], x[1]) >= 0

b = 3\*x[0] - 5\*x[1] - max(0.5\*x[0], 1\*x[1]) \* 0.6 <= 2.9

c = 3\*x[0] - 5\*x[1] + max(0.5\*x[0], 1\*x[1]) \* 0.6 >= 1.1

return a and b and c

def energy(x):

r1 = res1(x)

r2 = res2(x)

return x[0] + 5\*x[1] + 0.2 \* max(x[0], x[1]) if r1 and r2 else None

def Tm(initialTemperature, i):

T = initialTemperature / 2

return T

def takestate(state):

ub = 12.0

lb = 0.0

state\_new = np.random.uniform(0, 1, (1, 2)) \* (ub - lb) + lb

state\_new = state\_new[0]

return state\_new

def initstate():

ub = 12.0

lb = 0.0

E\_can = None

while E\_can is None:

init\_r = np.random.uniform(0, 1, (1, 2)) \* (ub - lb) + lb

init\_r = init\_r[0]

E\_can = energy(init\_r)

return init\_r, E\_can

T = 1000000

ep = 1000000

P = 0

r\_new, E\_curr = initstate()

for e in range(ep):

r\_new = takestate(r\_new)

E\_can = energy(r\_new)

if E\_can != None:

if E\_can > E\_curr:

E\_curr = E\_can

R\_max = r\_new

elif E\_can <= E\_curr:

dE = E\_can - E\_curr

if T > 1:

P = math.exp(-dE/T)

Rand = random.random()

if P > Rand:

T = Tm(T, e)

E\_curr = E\_can

R\_max = r\_new

xx0 = []

yy0 = []

xx1 = []

yy1 = []

xx2 = []

yy2 = []

r = np.arange(-10.0, 13.0, 0.01)

for y in r:

for x in r:

r1 = res1([x, y])

r2 = res2([x, y])

if r1 and r2:

xx0.append(x)

yy0.append(y)

elif r1:

xx1.append(x)

yy1.append(y)

elif r2:

xx2.append(x)

yy2.append(y)

plt.plot(xx1, yy1)

plt.plot(xx2, yy2)

plt.plot(xx0, yy0, 'yellow')

plt.plot(R\_max[0], R\_max[1], 'r+', markersize=15)

plt.show()