import numpy as np

import skfuzzy as fuzz

from skfuzzy import control as ctrl

time = ctrl.Antecedent(np.arange(10,121,1),'time')

rice = ctrl.Antecedent(np.arange(100,1001,1), 'rice')

power = ctrl.Consequent(np.arange(0,101,1), 'power')

time ['Rat Cham'] = fuzz.trimf(time.universe,[10,10,20])

time ['Cham']=  fuzz.trimf(time.universe,[10,20,40])

time ['Binh Thuong']= fuzz.trimf(time.universe,[20,40,60])

time ['Nhanh']= fuzz.trimf(time.universe,[40,60,80])

time ['Rat Nhanh']= fuzz.trimf(time.universe,[60,80,100])

rice['Rat it'] = fuzz.trimf(rice.universe,[100,100,300])

rice['It'] = fuzz.trimf(rice.universe,[100,300,600])

rice['Binh Thuong'] = fuzz.trimf(rice.universe,[300,600,900])

rice['Nhieu'] = fuzz.trimf(rice.universe,[600,900,1000])

rice['Rat Nhieu'] = fuzz.trimf(rice.universe,[900,1000,1000])

power['Rat Yeu'] = fuzz.trimf(power.universe,[0,0,25])

power['Yeu'] = fuzz.trimf(power.universe,[0,25,50])

power['Binh Thuong'] = fuzz.trimf(power.universe,[25,50,75])

power['Manh'] = fuzz.trimf(power.universe,[50,75,100])

power['Rat Manh'] = fuzz.trimf(power.universe,[75,100,100])

rule1 = ctrl.Rule(time['Rat Cham']&rice['Rat It'],power['Binh Thuong'])

rule2 = ctrl.Rule(time['Rat Cham']&rice['It'],power['Binh Thuong'])

rule3 = ctrl.Rule(time['Rat Cham']&rice['Binh Thuong'],power['Yeu'])

rule4 = ctrl.Rule(time['Rat Cham']&rice['Nhieu'],power['Yeu'])

rule5 = ctrl.Rule(time['Rat Cham']&rice['Rat Nhieu'],power['ratyeu'])

rule6 = ctrl.Rule(time['Cham']&rice['Rat Nhieu'],power['Yeu'])

rule7 = ctrl.Rule(time['Cham']&rice['Nhieu'],power['Yeu'])

rule8 = ctrl.Rule(time['Cham']&rice['Binh Thuong'],power['Binh Thuong'])

rule9 = ctrl.Rule(time['Cham']&rice['It'],power['Binh Thuong'])

rule10 = ctrl.Rule(time['Cham']&rice['Rat It'],power['Manh'])

rule11 = ctrl.Rule(time['Binh Thuong']&rice['Rat Nhieu'],power['Yeu'])

rule12 = ctrl.Rule(time['Binh Thuong']&rice['nhieu'],power['Binh Thuong'])

rule13 = ctrl.Rule(time['Binh Thuong']&rice['Binh Thuong'],power['Binh Thuong'])

rule14 = ctrl.Rule(time['Binh Thuong']&rice['it'],power['Manh'])

rule15 = ctrl.Rule(time['Binh Thuong']&rice['ratit'],power['Manh'])

rule16 = ctrl.Rule(time['Nhanh']&rice['Rat Nhieu'],power['Binh Thuong'])

rule17 = ctrl.Rule(time['Nhanh']&rice['Binh Thuong'],power['manh'])

rule19 = ctrl.Rule(time['Nhanh']&rice['it'],power['Manh'])

rule20 = ctrl.Rule(time['Nhanh']&rice['Rat It'],power['Rat Manh'])

rule21 = ctrl.Rule(time['Rat Nhanh']&rice['Rat Nhieu'],power['Binh Thuong'])

rule22 = ctrl.Rule(time['Rat Nhanh']&rice['Nhieu'],power['Manh'])

rule23 = ctrl.Rule(time['Rat Nhanh']&rice['Binh Thuong'],power['Manh'])

rule24 = ctrl.Rule(time['Rat Nhanh']&rice['It'],power['Rat Manh'])

rule25 = ctrl.Rule(time['Rat Nhanh']&rice['Rat It'],power['Rat Manh'])

tipping\_ctrl = ctrl.ControlSystem([rule1,rule2,rule3,rule4,rule5,rule6,rule7,rule8,rule9,rule10,rule11,rule12,rule13,rule14,rule15,rule16,rule17,rule18,rule19,rule20,rule21,rule22,rule23,rule24,rule25])

tipping = ctrl.ControlSystemSimulation(tipping\_ctrl)

tipping.input['time']= 5

tipping.input['rice']= 750

tipping.compute()

print(tipping.output['power'])

power.view(sim=tipping)

