Intelligent Algorithms – EN 525.770  
Homework 2  
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2) Verify identities are satisfied for ,, ,

a) Law of Contradiction

**Not satisfied**

b) Law of Excluded Middle

**Not satisfied**

c) Idempotency ,

**Satisfied**

d) Involution

**Satisfied**

e) Commutativity

**Satisfied**

f) Absorption of Compliment

**Not satisfied**

g) Demorgans Law

**Satisfied**

3) Prove *if* Idempotency identity holds with the Algebraic Sum

Algebraic Product

**Not Satisfied**

4) Prove that Sugeno and Yager Complements satisfy

Sugeno

**Sugeno Satisfied**

Yager

….

When w=1,

**Satisfied**

5) Cartesian Product of two Gaussian MF’s

c1 = [6];

sigma1 = [6];

c2 = [-6];

sigma2 = [4];

x = [-20:1:20];

ua = exp(-0.5 \* (((x-c1)/sigma1).^2));

ub = exp(-0.5 \* (((x-c2)/sigma2).^2));

ua\_cross\_ub = zeros(length(x),length(x));

for i=1:length(x),

for j=1:length(x),

ua\_cross\_ub(i,j) = min([ua(i),ub(j)]);

end

end

% hold on

% plot(x,ua)

% plot(x,ub)

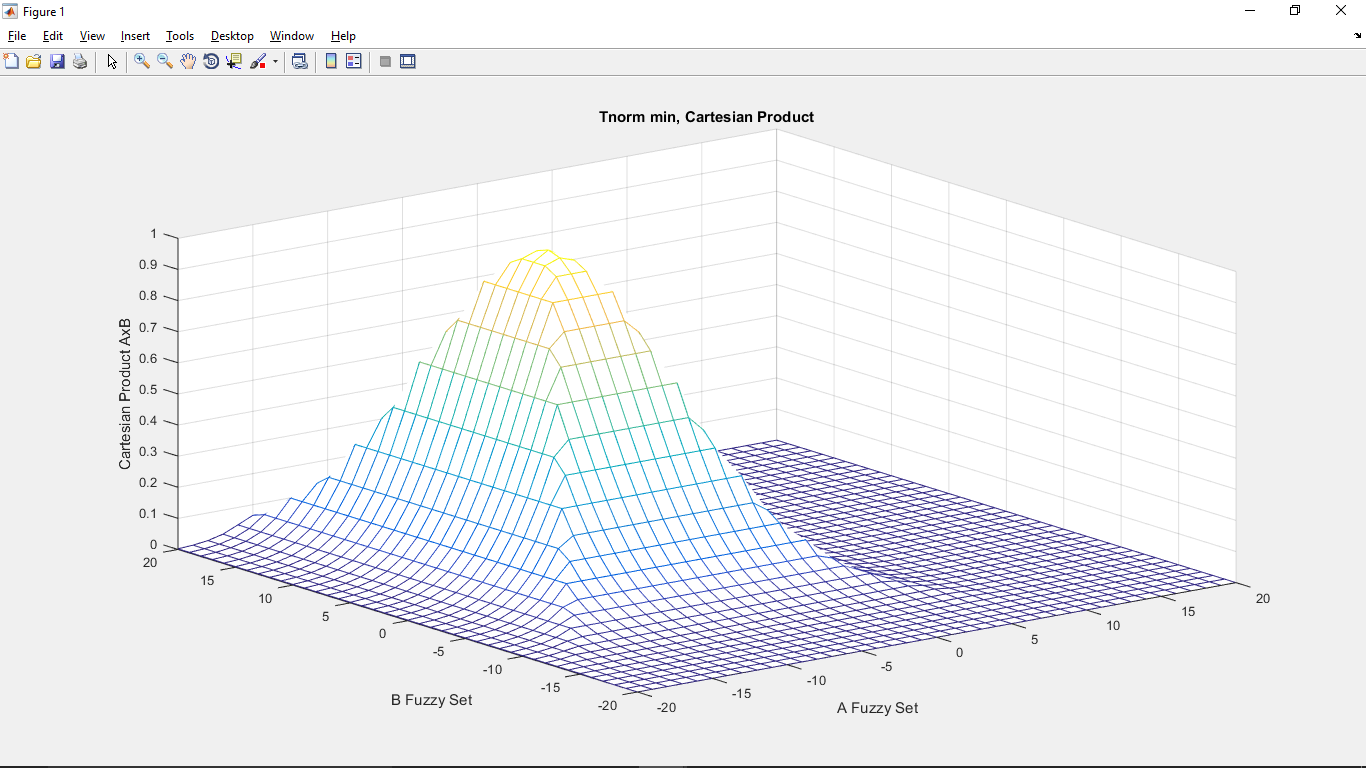
mesh(x,x,ua\_cross\_ub);

xlabel('A Fuzzy Set');

ylabel('B Fuzzy Set');

zlabel('Cartesian Product AxB');

title('Tnorm min, Cartesian Product');



6) Non-primary terms for membership functions “young” and “old”

x = [0:1:100]; %age

uyoung = exp(-(x/20).^2);

uold = exp(-((x-100)/30).^2);

hold on

plot(x,uyoung)

plot(x,uold)

% not very young and not very old

a = min((1-(uyoung.^2)),(1-(uold.^2)));

plot(x,a)

% very young or very old

b = max((uyoung.^2),(uold.^2));

plot(x,b)

xlabel('X - Universe of Discourse (Age)');

ylabel('Membership Grade');

title('Non-primary Calculations for Age Groups');

legend('young', 'old', 'not very young and not very old', 'very young or very old')

