function S = gen\_scheme\_cos2(L,P) % cosine square distribution - length of the generated sparse vector, P - percentage of "1" in the vector

nr = int32(L\*P\*0.01);

nus = zeros(1,L);

k=1;

mini=0.0;

dint=pi/(4.0\*double(nr));

gen=0;

run="ok";

while (k<=nr)

check = "fals";

left=0.0;

right=pi/2.0;

fnc\_old=-k\*dint;

while (check == "fals")

x=(left+right)/2.0;

fnc=x/2.0+sin(2.0\*x)/4.0-k\*dint;

if (sqrt(abs(fnc\_old\*\*2-fnc\*\*2))<0.0000000001)

maxi=x;

break;

else

fnc\_old=fnc;

endif

if (fnc > 0)

right=x;

else

left=x;

endif

endwhile

gen++;

if (gen > 1 && run=="ok")

run="no";

endif

relax=0;

while ( gen > 0 && relax < 20 )

relax++;

X = int32(unifrnd(mini,maxi)\*(L-1)\*2.0/pi);

if (nus(X+1) == 0)

nus(X+1) = 1;

gen--;

relax=0;

endif

endwhile

mini=maxi;

k++;

endwhile

if(sum(nus) < nr)

n=1;

while ( gen > 0 && n<=nr )

if(nus(n) == 0)

nus(n) = 1;

gen--;

endif

n++;

endwhile

endif

S = nus;