```
%% INIZIALIZZAZIONE %%
close all           %%
clear all           %%
format long         %%
%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%% SELEZIONE PARAMETRI DELLE FUNZIONI X1(t) E X2(t) %%
%%                                                   %%
A1 = 5;  %% ampiezza
T1 = 10; %% periodo
%%                                                   %%
A2 = 5;  %% ampiezza
T2 = 10; %% periodo
%%                                                   %%
delta_phi = 0.0; %% sfasamento (in periodi)
%%                                                   %%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

%% FUNZIONI %%
omega1 = 2*pi/T1;
omega2 = 2*pi/T2;
phi1 = 2 * pi * 0;
phi2 = phi1 + 2 * pi * delta_phi;

t=0:0.01:30; %% intervallo temporale: da 0 a 30 a passi da 0.01

X1t = A1 * sin(omega1 * t + phi1);  %% X1(t)
X2t = A2 * sin(omega2 * t + phi2);  %% X2(t)
X1t2 = X1t .* X1t;
X2t2 = X2t .* X2t;
X12pX22 = X1t2+X2t2;

X1pX2 = X1t + X2t;
Xtot2 = X1pX2 .* X1pX2;

diff = Xtot2 - X1t2 - X2t2;

%% CALCOLO DELLE MEDIE EFFETTUATE SU UN PERIODO %%
X1media = mean(X1t);
X2media = mean(X2t);
Xtotmedia = mean(X1pX2);

X12media = mean(X1t2);
X22media = mean(X2t2);
Xtot2media = mean(Xtot2);

nointerf = mean (X12pX22);
interf = mean(diff);

%{

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%  SEZIONE CALCOLO DEI VALORI MEDIATI SU UN PERIODO
%% togliere il segno di commento % se si vuole attivare la scrittura su schermo dei↙
valori

disp(strcat('X1(t):  A1 = ',num2str(A1),'   T1 = ',num2str(T1),'   phi1 = ',num2str↙
(phi1)))
disp(strcat('X2(t):  A2 = ',num2str(A2),'   T2 = ',num2str(T2),'   phi2 = ',num2str↙
(delta_phi)))
disp(strcat('             X1(t)      -->   media = ',num2str(round((X1media),1))))
```

```
disp(strcat('             X2(t)      -->   media = ',num2str(round((X2media),1))))
disp(strcat('           X1(t)+X2(t)  -->   media = ',num2str(round((Xtotmedia),1))))
disp(strcat('             I1(t) = k X1(t)^2  -->   media = ',num2str(round((X12media),↙
1))))
disp(strcat('             I2(t) = k X2(t)^2  -->   media = ',num2str(round((X22media),↙
1))))
disp(strcat('          I1(t)+I2(t)           -->   media = ',num2str(round((nointerf),↙
1))))
disp(strcat('          I(t) = k (X1+X2)^2    -->   media = ',num2str(round↙
((Xtot2media),1))))
disp(strcat('          I(t) - [I1(t)+I2(t)]  -->   media = ',num2str(round((interf),↙
1))))

%}
vec=ones(1,length(t));
X1media_vec=vec.*X1media;
X2media_vec=vec.*X2media;
Xtotmedia_vec=vec.*Xtotmedia;
X12media_vec=vec.*X12media;
X22media_vec=vec.*X22media;
Xtot2media_vec=vec.*Xtot2media;
nointerf_vec=vec.*nointerf;
interf_vec=vec.*interf;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%                    SEZIONE GRAFICI                   %%
tmin=0;
tmax=30;
ymin=-10;
ymax=10;

subplot(4,2,1)
axis([tmin tmax ymin ymax])
hold on
plot(t,X1t,'k');
plot(t,X1media_vec,'.r','MarkerSize',1 );
grid on
xlabel('t')
ylabel('X_1')

subplot(4,2,3)
axis([tmin tmax ymin ymax])
hold on
plot(t,X2t,'k');
plot(t,X2media_vec,'.r','MarkerSize',1 );
grid on
xlabel('t')
ylabel('X_2')

subplot(4,2,5)
axis([tmin tmax ymin ymax])
hold on
plot(t,X1pX2,'k');
plot(t,Xtotmedia_vec,'.r','MarkerSize',1 );
grid on
xlabel('t')
ylabel('X_1 + X_2')

%{

subplot(4,2,2)
axis([tmin tmax 0 50])
hold on
```

```
plot(t,X1t2,'b');
plot(t,X12media_vec,'.r','MarkerSize',1 );
grid on
xlabel('t')
ylabel('I_1 = X_1^2')

subplot(4,2,4)
axis([tmin tmax 0 50])
hold on
plot(t,X2t2,'b');
plot(t,X22media_vec,'.r','MarkerSize',1 );
grid on
xlabel('t')
ylabel('I_2 = X_2^2')

subplot(4,2,6)
axis([tmin tmax 0 50])
hold on
plot(t,X12pX22,'b');
plot(t,nointerf_vec,'.r','MarkerSize',1 );
grid on
xlabel('t')
ylabel('I_1+I_2')

%}

%{

subplot(4,2,7)
axis([tmin tmax 0 100])
hold on
plot(t,Xtot2,'b');
plot(t,Xtot2media_vec,'.r','MarkerSize',1 );
grid on
xlabel('t')
ylabel('I = (X_1+X_2)^2')

subplot(4,2,8)
axis([tmin tmax -50 50])
hold on
plot(t,diff,'k');
plot(t,interf_vec,'.r','MarkerSize',1 );
grid on
xlabel('t')
ylabel('I - I_1 - I_2')

%}
%% FINE PROGRAMMA %%
```