%sysms x

%f(x) = exp(x)

%taylor(f(x),x,'order',8)

%factorial(0:7)

%taylor(sin(x),x,'order',8)

%

%

%

%

%

%

%taylor(sin(x), x, 'order', 8)

%

% EX 1

%

%syms x %symbolic variable

%f(x) = exp(x);

%fplot(x, [-3,3]);

%clf;

%hold on

%for i = 1:4

% T(x) = taylor(f(x), x, 'order', i+1) % T = Taylor

% fplot(T, [-3,3])

%end

%%%%%%%%%%%%%%%%%%%%

%n = 0;

%while 3 / factorial(n+1) >= 10^-6

% n = n + 1;

%end

%n

%T(x) = taylor(f(x), x, 'order', n+1); % order ~ degree of poly

%aprox = double(T(1));

%exact = double(exp(1));

%abs(exact - aprox)

%EX 2

syms x % symbolic variable

f(x) = sin(x);

clf;

hold on

fplot(f, [-pi,pi]); % plot the original function

for i = [3:5]

T(x) = taylor(f(x), x, 'order', i+1); % T = Taylor series expansion

fplot(T, [-pi,pi]) % plot each approximation

end

%%%%%%%%%%%%%%%%%%%%

n = 0;

while (pi/5)^(2\*n+1) / factorial(2\*n+1) >= 10^-5

n = n + 1;

end

n

T(x) = taylor(f(x), x, 'order', 2\*n+1); % order ~ degree of polynomial

aprox = double(T(pi/5)) % approximation at x = 1

exact = double(sin(pi/5)) % exact value of e^1

abs(exact - aprox) % absolute error