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1 % Kavya Manchanda
2 % 11/1/2022
3 % ECE 202: Project 1 – Power Expansion Series of function of the form
4 %  $\cos(wt)$ 
5 % Phase 1 : Getting a relatively simple script working as quickly as
6 % possible
7
8 clear; clf;
9 format shortG;
10
11 tmin = 0;
12 tmax = 0.2; % in s
13
14
15 t = linspace(tmin, tmax, 401); % time in s
16
17 n = 0:2:10; % number of terms
18
19 % The coefficients associated with the power series expansion
20 an = 12*(-1).^(n/2).*40.^n./factorial(n)
21
22 f1 = an(1)*t.^n(1); % first sum (ie. first term) in the power series
23 f2 = f1 + an(2)*t.^n(2); % sum of first two terms
24 f3 = f2 + an(3)*t.^n(3); % sum of first three terms
25 f4 = f3 + an(4)*t.^n(4); % sum of first four terms
26 f5 = f4 + an(5)*t.^n(5); % sum of first five terms
27 f6 = f5 + an(6)*t.^n(6); % sum of first six terms
28
29 plot(t,f1,t,f2,t,f3,t,f4,t,f5,t,f6,'LineWidth',1.6)
30 xlabel('time t (s)');
31 ylabel('f(t)')
32 ylim([-15,15])
33 title("ECE 202 Project 1 Phase 1")
34 subtitle("Power series expansion of  $f(t)=12\cos(40t)$  using truncated " + ...
35 "sums with up to 6 non-zero terms.")
36
37 grid on
38
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