```matlab
 1 % Sounak Ghosh
 2 % 11/28/19
 3 % ECE 202 - Fall 2019 - MATLAB Exercise M8
 4 % Solving a system of linear equations using the Inverse Method to convert
 5 % to partial fraction expansion.
 6
 7 clear % clears all variables in the workpace; avoids common errors
 8
 9 xmin = -4;                             % min value of x
10 xmax = 4;                              % max value of x
11 n = input("Number of Terms = ");    % number of points to have in the array
12 x = linspace(xmin, xmax, n);        % making an array of n points from xmin to↙
xmax
13
14 % ------ Given ---------
15 c = 6;                     % value of c in the eqn. ax^2+bx+c
16 b = 5;                     % value of b in the eqn, ax^2+bx+c
17 bx = b*x;                  % bx in ax^2+bx+c
18 a = 4;                     % value of a in the eqn, ax^2+bx+c
19 ax2 = a * x.^2;            % ax^2 in ax^2+bx+c
20
21 % ------ Fraction Expansion ---------
22 N = ax2 + bx + c;          % Numerator i.e. 4x^2+5x+6
23 D1 = x - 1;                % Denominator for the first term
24 D2 = x - 2;                % Denominator for the second term
25 D3 = x - 3;                % Denominator of termthe third
26 D = D1 .* D2 .* D3;        % Common denominator
27
28 % ------ Matrix calculation ---------
29 A = [1 1 1; -5 -4 -3; 6 3 2];   % Coefficient matrix A of Ax=b
30 b = [4 ; 5; 6];            % b matrix of Ax=b
31 C = inv(A)* b              % find the solution of a system of linear eqn. through the↙
inverse method
32
33 R_Lhs = N./D;              % left hand side eqn. R(x) = N(x)/D(x)
34 R1 = C(1)./D1;             % first RHS term
35 R2 = C(2)./D2;             % second RHS term
36 R3 = C(3)./D3;             % third RHS term
37 R_Rhs = R1 + R2 + R3;      % RHS total
38
39 % ------- Checks --------------------
40 check = sum(abs(R_Lhs - R_Rhs))   % check using the absolute value function
41
42 % For some values of n like 5, 9 etc. it results in a zero in x array which
43 % is used to calculate the denominator of the array causing matlab to show
44 % Not A Number (NaN) as it can't divide by zero. The number of input terms
45 % i.e. the intervals in the linspace command can cause to have zero as one
46 % of the values in the array and we use the x array values to calculate the
47 % denominator, which with a zero will result in a NaN (not a number) as
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48 % no number can be divided by zero.
49
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