```matlab
% MAE488_Nicholas_Hawse_HW1
% MAE 488 03 Analisis of ANALY ENGINEERING SYSTEMS
% Homework 2
% Nicholas Hawse
% 1/26/2025

% This code checks the hand calculated partial fraction decompositions
% of the homework questions useing the residual function.


%
==========================================================================
% Problem 2
%
==========================================================================
% In this problem you find the patial fraction expasion of several
% functions then take the inverse lapace transform of each function.
% this code calculates the roots of the denomenator function and
% calculates the coeffients of the partial fraction expasion.
%
clc;clear;close

%problem 2 part a
fprintf('=============================\n')
fprintf('Problem 5 \n')
fprintf('=============================\n')
fprintf('This code determines the coeffients on the partial fraction\n')
fprintf(['decomposition of the laplace transform functions useing' ...
    ' the \nresidual function built into matlab\n'])

fprintf('=============================\n')
fprintf('Problem 5 Part a\n')
fprintf('=============================\n')

%

partATopFun = 32; % the coeffient of the function in the numerator of the
function

partABottomFun = [1 8 16 0]; % the coeffient of the function in the
denominator of the function

[partAR,~,~] = residue(partATopFun,partABottomFun); %finds the coeffients
for the PFD

%problem 2 part b

fprintf('The partial fraction decomposition has coeffients %2d %2d
%2d\n\n',partAR)

fprintf('=============================\n')
fprintf('Problem 5 Part b\n')
```

```matlab
fprintf('=============================\n')


partBTopFun = [2 10 4]; % the coefficent of the function in the numerator of
the function
partBBottomFun = [1 2 0 0]; % the coefficent of the function in the
denominator of the function

[partBR,~,~] = residue(partBTopFun,partBBottomFun); %finds the coefficents
for the PFD

fprintf('The partial fraction decomposition has coefficents %2d %2d %2d\n\n'
...
    ,partBR)

%problem 2 part c

fprintf('=============================\n')
fprintf('Problem 5 Part c\n')
fprintf('=============================\n')


partCTopFun = [4 14]; % the coefficent of the function in the numerator of
the function
partCBottomFun = [1 4 13]; % the coefficent of the function in the
denominator of the function

[partCR,~,~] = residue(partCTopFun,partCBottomFun); %finds the coefficents
for the PFD

fprintf('The partial fraction decomposition has coefficents %4s %4s\n\n' ...
    ,num2str(partCR(1)),num2str(partCR(2)))

%problem 2 part d

fprintf('=============================\n')
fprintf('Problem 5 Part d\n')
fprintf('=============================\n')


partDTopFun = [46 48]; % the coefficent of the function in the numerator of
the function
partDBottomFun = [1 11 24 0]; % the coefficent of the function in the
denominator of the function

[partDR,~,~] = residue(partDTopFun,partDBottomFun); %finds the coefficents
for the PFD

fprintf('The partial fraction decomposition has coefficents %2.0f %2.0f
%2d\n' ...
    ,partDR)

=============================
Problem 5
```

```
==============================
This code determines the coefficents on the partial fraction
decomposition of the laplace transform functions useing the
residual function built into matlab
==============================
Problem 5 Part a
==============================
The partial fraction decomposition has coefficents -2 -8  2


==============================
Problem 5 Part b
==============================
The partial fraction decomposition has coefficents -2  4  2


==============================
Problem 5 Part c
==============================
The partial fraction decomposition has coefficents 2-1i 2+1i


==============================
Problem 5 Part d
==============================
The partial fraction decomposition has coefficents -8  6  2
```

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