
Midterm

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This is a template file for the first assignment to get started with running and publishing code in Matlab. Each problem has its own section (delineated by `%%`) and can be run in isolation by clicking into the particular section and pressing `Ctrl + Enter` (evaluate current section).

To generate a pdf for submission in your current directory, use the following three lines of code at the command window:

```
>> options.format = 'pdf'; options.outputDir = pwd; publish('midterm.m', options)
```

Problem 6

```
clear();

[L, U] = outerProductLU([1 1 1 1 1;
    2 4 4 4 4;
    3 7 10 10 10;
    4 10 16 20 20;
    5 13 22 30 35]);

display(L);
display(U);

[L, U] = outerProductLU([0 0 ; 0 0]);
display(L);
display(U);

function [L,U] = outerProductLU(A)
dimensions = size(A);
n = dimensions(1);
L = zeros(n, n);
U = zeros(n, n);
for i = 1:n
    if A(i, i) == 0
        disp("One of the pivots has become 0");
        L = [];
        U = [];
        break
    end
    L(:, i) = A(:, i) / A(i, i);
    U(i, :) = A(i, :);
    A = A - L(:, i) * U(i, :);
end
end

L =
```

1	0	0	0	0
2	1	0	0	0
3	2	1	0	0
4	3	2	1	0
5	4	3	2	1

$U =$

1	1	1	1	1
0	2	2	2	2
0	0	3	3	3
0	0	0	4	4
0	0	0	0	5

One of the pivots has become 0

$L =$

$[\]$

$U =$

$[\]$

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