Table

Description automatically generated

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1. Anonymous functions and plotting continuous functions

A.1

Text, letter

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Code A1a. Matlab code for Figure 1.46.

Chart, line chart

Description automatically generated

Figure 1.46. Generated graph.

Text, letter

Description automatically generated

Code A1b. Matlab code required to generate Figure 1.47.

Chart, line chart

Description automatically generated

Figure 1.47. Generated graph.

A.2

Text

Description automatically generated

Code A2. Code for plotting Figure A.2.

Chart, line chart

Description automatically generated

Figure A.2. Graph of e^(-t).

A.3

Figure 1.46 and Figure A.2 are identical. Because of the bounds and increments, both graphs ended up identical.

1. Time shifting and time scaling

B.1

Text, letter

Description automatically generated

Code B1. Code for p(t).

Chart, histogram

Description automatically generated

Figure 1.50. Generated graph of page 129.

B.2

Graphical user interface, text

Description automatically generated

Code B2a. Code for r(t), using p(t).

Chart, line chart

Description automatically generated

Figure B.2a. r(t) graph generated by code above.

Graphical user interface, text

Description automatically generated

Code B2b. Code to plot n(t).

Chart, line chart

Description automatically generated

Figure B.2b. Generated graph of n(t).

B.3

Graphical user interface, text, application, email

Description automatically generated

Code B3a.

Chart, line chart

Description automatically generated

Figure n1. Full-scale graph of above code, over entire required axis.

Graphical user interface, text, application

Description automatically generated

Code B3b.

Chart, line chart

Description automatically generated

Figure n2. Full-scale graph of above code, over entire required axis.

B.4

Graphical user interface, text, application

Description automatically generated

Code B4a. Code for plot n3.

Chart, line chart

Description automatically generated

Figure n3. Figure ranging from -1 to 5.

Graphical user interface, text

Description automatically generated

Code B4b.

Chart, line chart

Description automatically generated

Figure n4. Full figure of n4 over required x-axis.

B.5

In both of the graphs, the beginning and peak of the positive slope have identical x and y coordinates, meaning the slope must also be identical. Both graphs also have the same ending y-value (the value of y that corresponds to the defined end of the time boundary), which is (2,0.75). By going over each graph point by point, we notice that all points align. This is enough for us to conclude that both graphs are identical.

1. Visualizing operations on the independent variable and algorithm vectorization

C.1

Text, letter

Description automatically generated

Code C1.

Chart, line chart

Description automatically generated

Figure g1. Graph of our altered version of textbook’s g(t).

C.2

Text, letter

Description automatically generated

Code C2.

Chart, line chart

Description automatically generated

Figure s1. Generated graph of s(t), using our previous g(t) code.

C.3

Text

Description automatically generated

Code C3. Also used in part C.4.

Chart, histogram

Description automatically generated

Figure s2. All value sets of alpha, on one graph, with legend.

C.4

The size of matrix generated by s(t) was found to be 1x401, for a total of 401 elements. The code used was integrated within Code C3. Image showing this is below:

Chart, box and whisker chart

Description automatically generated

1. Array indexing

D.1

Text

Description automatically generated

Code D1.

a)

This function displays/lists all elements of matrix A in a single column, in order, from top left being the first, and going downwards, for each column until the bottom right value.

Text, letter

Description automatically generated

b)

This displays all matrix values in positions 2, 4 and 7, with 1 being the upper-left most value, going downwards and right.

A picture containing text

Description automatically generated

c)

This function is used to create a 5x4 (or whatever given matrix size we have) logical array consisting of only 0’s and 1’s. In this case, we defined the function to make it a value of 1 wherever the element value was greater or equal to 0.2 and place a 0 everywhere else.

A picture containing calendar

Description automatically generated

d)

This command now lists all of the elements in a similar way as part a), however, now it only takes the elements which have a value that is greater than or equal to 0.2, and discards any values less than 0.2.

Text

Description automatically generated

e)

This function now searches through our matrix A, and replaces any element that has a value greater than or equal to 0.2 with 0, and keeps all other values as they were, and then displays the new matrix.

Text

Description automatically generated

D.2

a)

Text

Description automatically generated

Code D2a.

b)

Text

Description automatically generated with medium confidence

Code D2b. Same job as Code D2a, but with matlab indexing features.

c)

i)

Text

Description automatically generated

Code D2c. Same as code D2a, but with tic and toc implemented to track the time required to complete.

A picture containing text

Description automatically generated

ii)

Text

Description automatically generated with medium confidence

Code D2d. Same as code D2b, but with tic and toc implements to track the time required to complete.

A picture containing text

Description automatically generated

NOTE: The time varies slightly each time the code is executed, so noted values are approximate. However, we can see that while extremely close, the second implementation appears to be slightly faster.

D.3

Text

Description automatically generated

Code D4. Code with all specifications accommodated.

The number of elements set to 0 is 58, as calculated by the program:

Text

Description automatically generated with medium confidence