5.8 Exercises

5.1 Write the MATLAB statements required to calculate $y(t)$ from the equation

$$y(t) = \begin{cases} -3t^2 + 5 & t \geq 0 \\ 3t^2 + 5 & t < 0 \end{cases}$$

for values of $t$ between -9 and 9 in steps of 0.5. Use loop and branches to perform this calculation.

5.3 Write the MATLAB statements required to calculate and print out the squares of all the even integers between 0 and 50. Create a table consisting of each integer and its square, with appropriate labels over each column.

5.7 Examine the following for statements and determine the value of $ires$ at the end of each of the loops and also the number of times each loop executes.

(a) $ires=0;$
   for index=-10:10
      $ires=ires+1;$
   end

(b) $ires=0;$
    for index=10:-2:4
       if index==6
          continue;
       end
       $ires=ires+index;$
    end

(c) $ires=0;$
    for index=10:-2:4
       if index==6
          break;
       end
       $ires=ires+index;$
    end

(d) $ires=0;$
    for index1=10:-2:4
       for index2=2:2:index1
          if index2==6
             break;
          end
          $ires=ires+index2;$
       end
    end
5.8 Exam the following while loop and determine the value of ires at the end of each of the loops and also the number of times each loop executes.

(a) ires=1;
    while mod(ires,10)~=0
        ires=ires+1;
    end
(b) ires=2;
    while ires<=200
        ires=ires^2;
    end
(c) ires=2;
    while ires>200
        ires=ires^2;
    end

5.9 What is contained in array arr1 after each of the following sets of statements is executed?

(a) arr1=[1 2 3 4; 5 6 7 8; 9 10 11 12];
    mask=mod(arr1,2)==0;
    arr1(mask)=-arr1(mask);
(b) arr1=[1 2 3 4; 5 6 7 8; 9 10 11 12];
    arr2=arr1<=5;
    arr1(arr2)=0;
    arr1(~arr2)=arr1(~arr2).^2;

5.23 Fibonacci Numbers. The nth Fibonacci number is defined by the following recursive equations:
\[ f(1)=1 \]
\[ f(2)=2 \]
\[ f(n)=f(n-1)+f(n-2) \]

Therefore \( f(3)=f(2)+f(1)=2+1=3 \), and so forth for higher numbers. Write an M-file to calculate and write out the nth Fibonacci number for \( n>2 \), where \( n \) is input by the user. Use a while loop to perform the calculation.