```
t = [0:0.00005:1];
frequencies_vector = [3,10,20,51,100,201,348,1010];
Rb = [10,100,10^3,10^4,10^5,10^6,10^6,10^6];
Xbc = [10^3,10^2,10^1,10^-1,10^-3,10^-5,10^-7,10^-9];
Xbc = -1 ./ (frequencies_vector .* Xbc * 2 * pi)
Relectrode = [169001,122323,73802,34398,17902,9316,5407,2727];
for j = 1:8
input_vector = 1*10^-6*cos(frequencies_vector(j) * 2 * pi * t);
resistor_w_value = Relectrode(j);
output_vector =  (sqrt(Rb(j)^2 + Xbc(j)^2) *
 cos(frequencies_vector(j)*2*pi*t + atan(Xbc(j)/Rb(j))) + 2 *
 Relectrode(j)) .* input_vector;
disp(voltage_signal_analysis(t,output_vector,input_vector,frequencies_vector(j)*2*
figure
plot(t,output_vector);
xlabel('time')
ylabel('voltage')

end
```

```
Xbc =

   1.0e+05 *

  Columns 1 through 7

   -0.0000   -0.0000   -0.0000   -0.0000   -0.0000   -0.0008   -0.0457

  Column 8

   -1.5758


Local minimum possible.

lsqcurvefit stopped because the final change in the sum of squares
 relative to
its initial value is less than the selected value of the function
 tolerance.



   8.4368e-18

   10.0000   -0.0001


Local minimum possible.

lsqcurvefit stopped because the final change in the sum of squares
 relative to
```

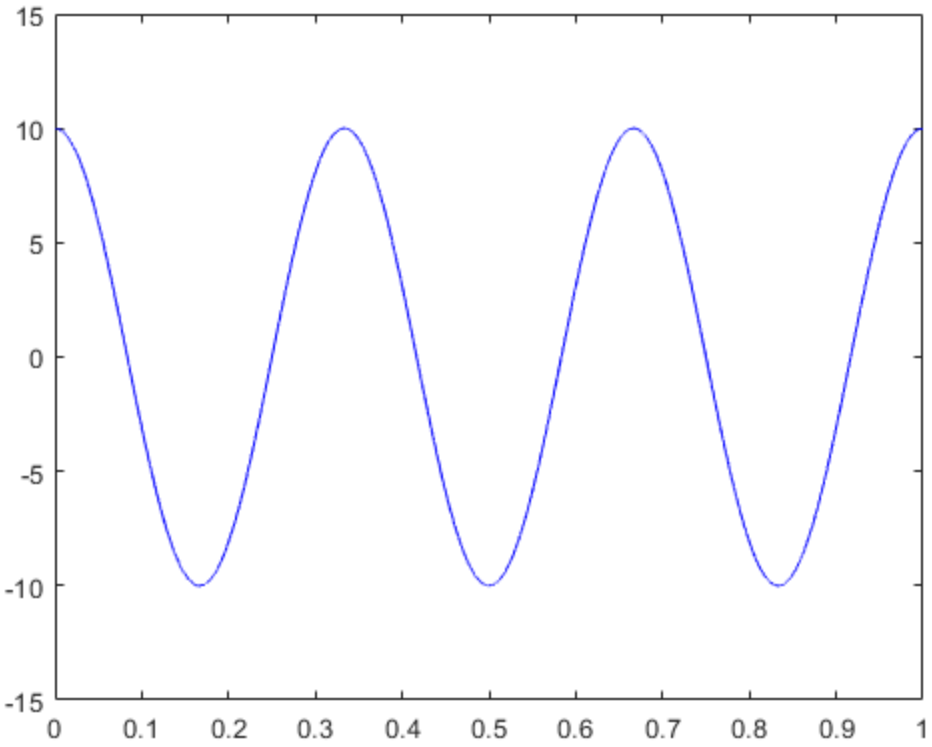
```
its initial value is less than the selected value of the function
 tolerance.



   4.0547e-18

  100.0000   -0.0002


Local minimum possible.

lsqcurvefit stopped because the final change in the sum of squares
 relative to
its initial value is less than the selected value of the function
 tolerance.



   1.6261e-18

   1.0e+03 *

    1.0000   -0.0000


Local minimum possible.

lsqcurvefit stopped because the size of the current step is less than
the default value of the step size tolerance.



   6.8036e-18

   1.0e+04 *

    1.0000   -0.0000


Local minimum possible.

lsqcurvefit stopped because the size of the current step is less than
the default value of the step size tolerance.



   9.6050e-13

   1.0e+05 *

    1.0000   -0.0000
```

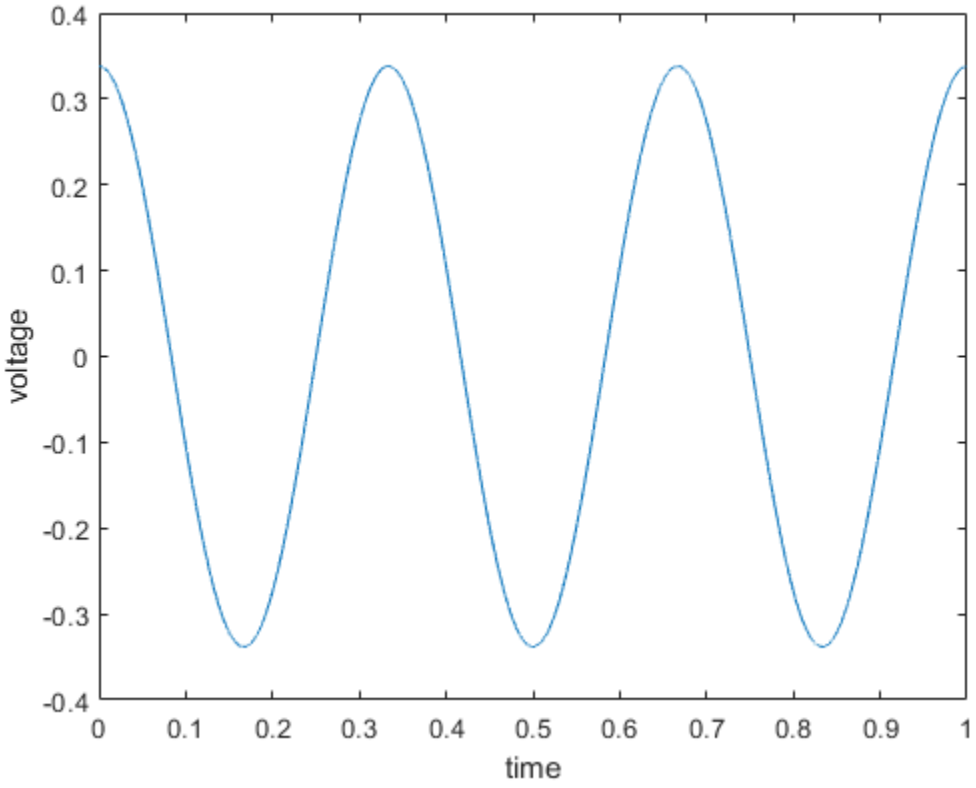
```
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2e-05 may
improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0002e-05
may improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0015e-05
may improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0014e-05
may improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2e-05 may
improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2e-05 may
improve results.

Local minimum possible.

lsqcurvefit stopped because the size of the current step is less than
the default value of the step size tolerance.



   1.4342e-12

   1.0e+06 *
```

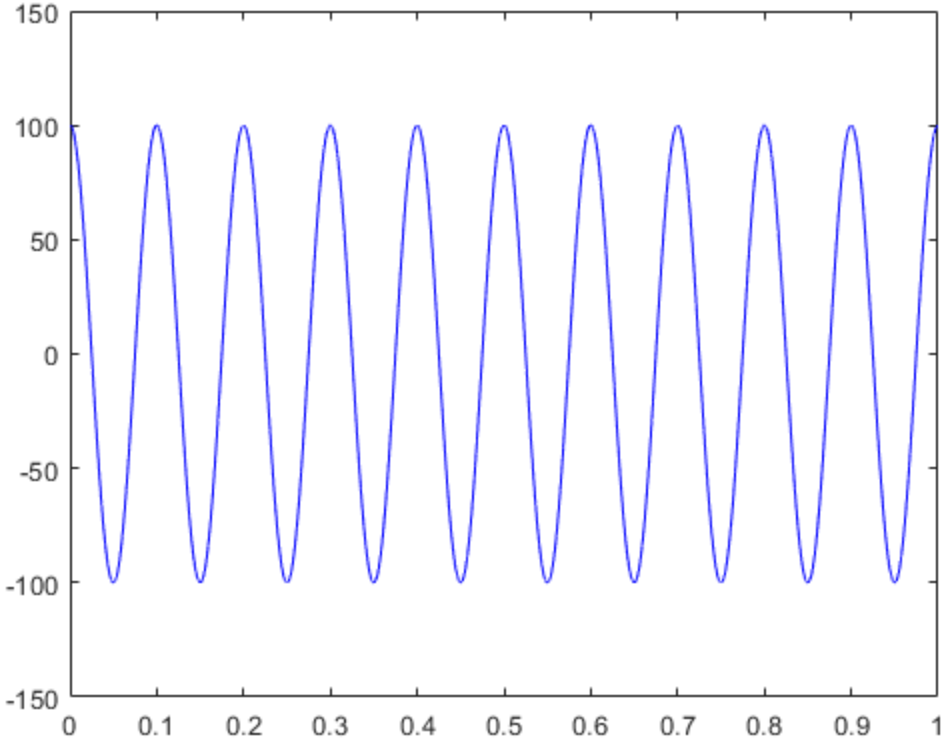
```
    1.0000   -0.0001

Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2e-05 may
improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0028e-05
may improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.001e-05 may
improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0018e-05
may improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0013e-05
may improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2e-05 may
improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2e-05 may
improve results.

Local minimum possible.
```

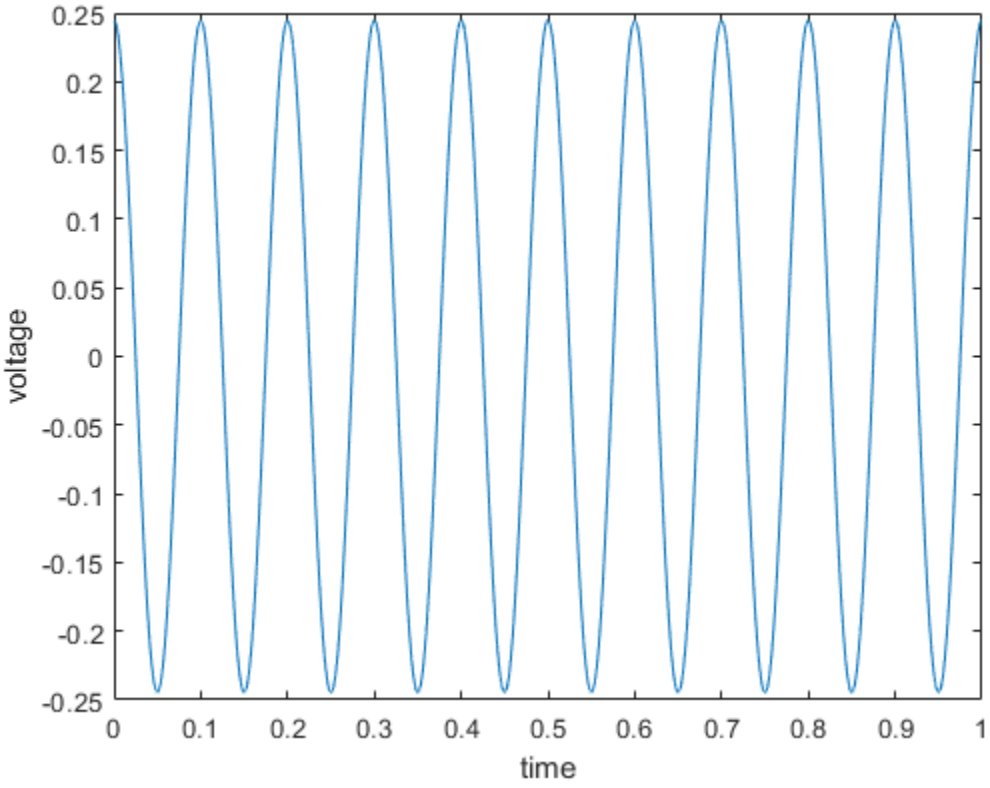
```
lsqcurvefit stopped because the size of the current step is less than
the default value of the step size tolerance.



   3.8438e-12

   1.0e+06 *

    1.0000   -0.0046

Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2e-05 may
improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0895e-05
may improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.018e-05 may
improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0546e-05
may improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0573e-05
may improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0532e-05
may improve results.
```

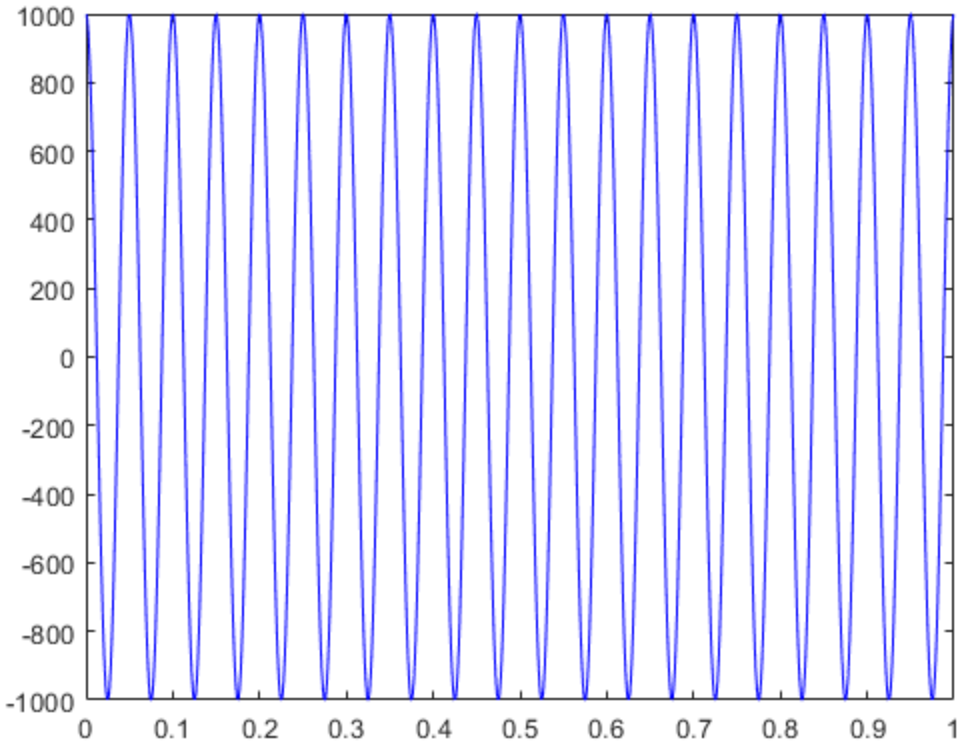
```
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2.0013e-05
may improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2e-05 may
improve results.
Warning: Derivative finite-differencing step was artificially reduced
 to be
within bound constraints. This may adversely affect convergence.
 Increasing
distance between bound constraints, in dimension 2, to be at least
 2e-05 may
improve results.

Local minimum possible.

lsqcurvefit stopped because the size of the current step is less than
the default value of the step size tolerance.



   1.4247e-09

   1.0e+06 *

    1.0000   -0.1576
```

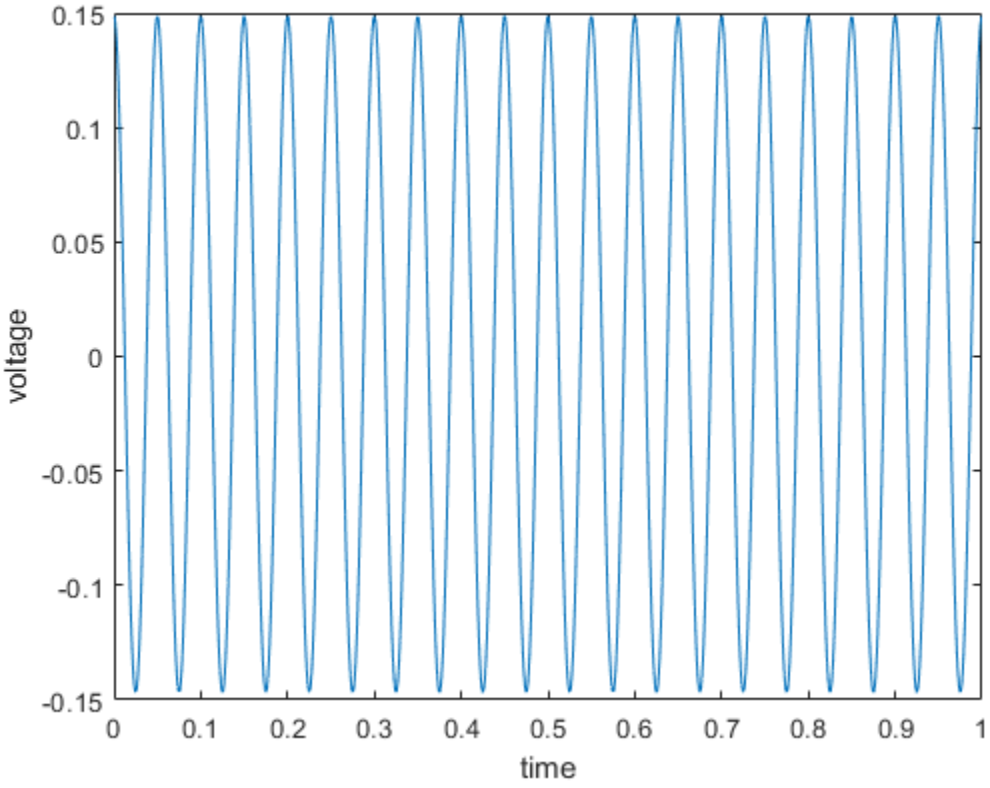

15
10
5
0
-5
-10
-15
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

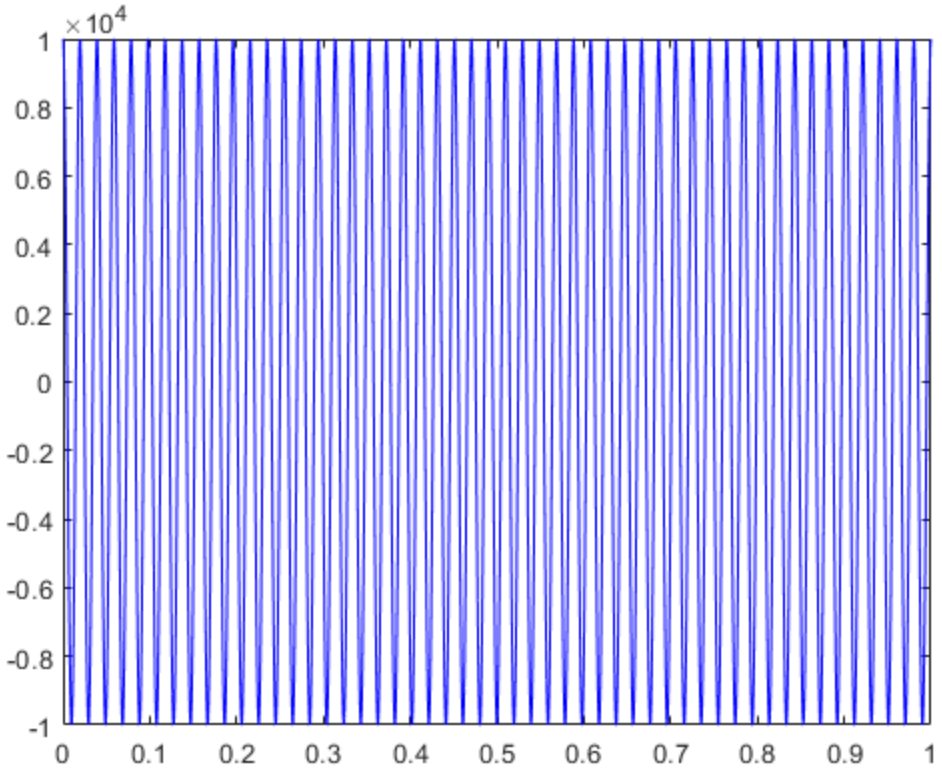

0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
voltage
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
time

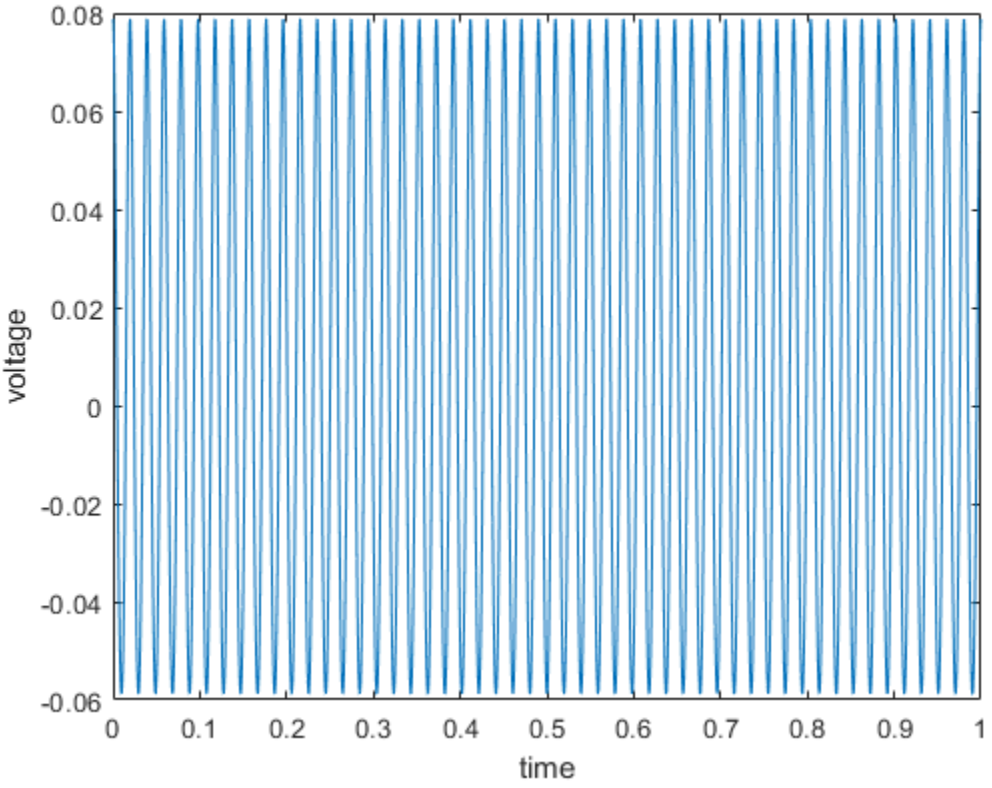

150
100
50
0
-50
-100
-150
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

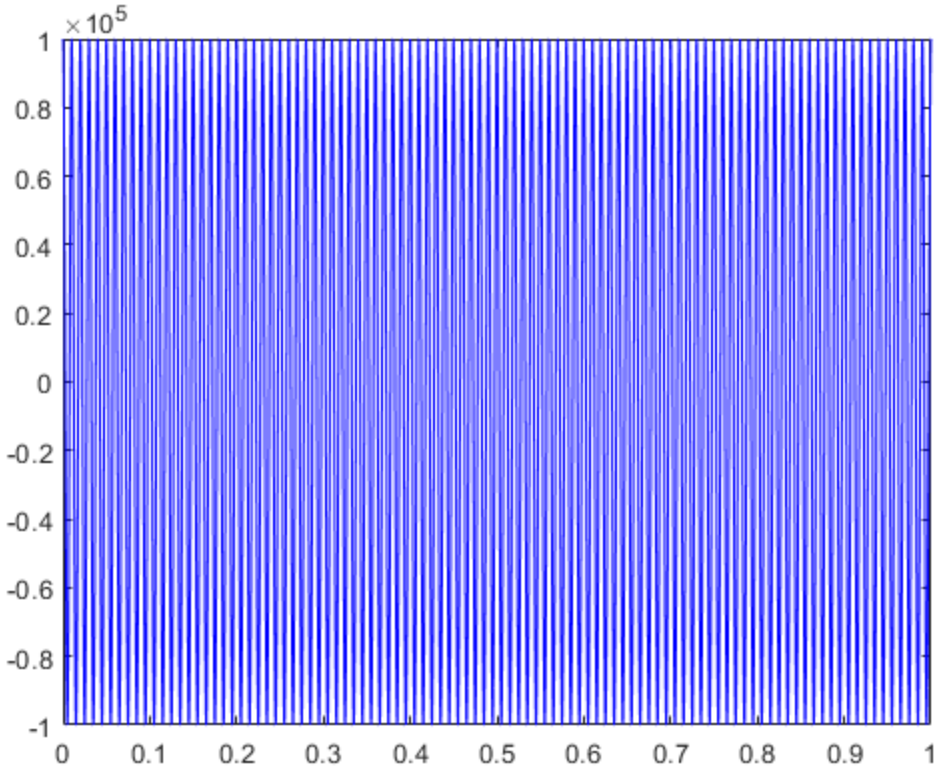

0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
voltage
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
time

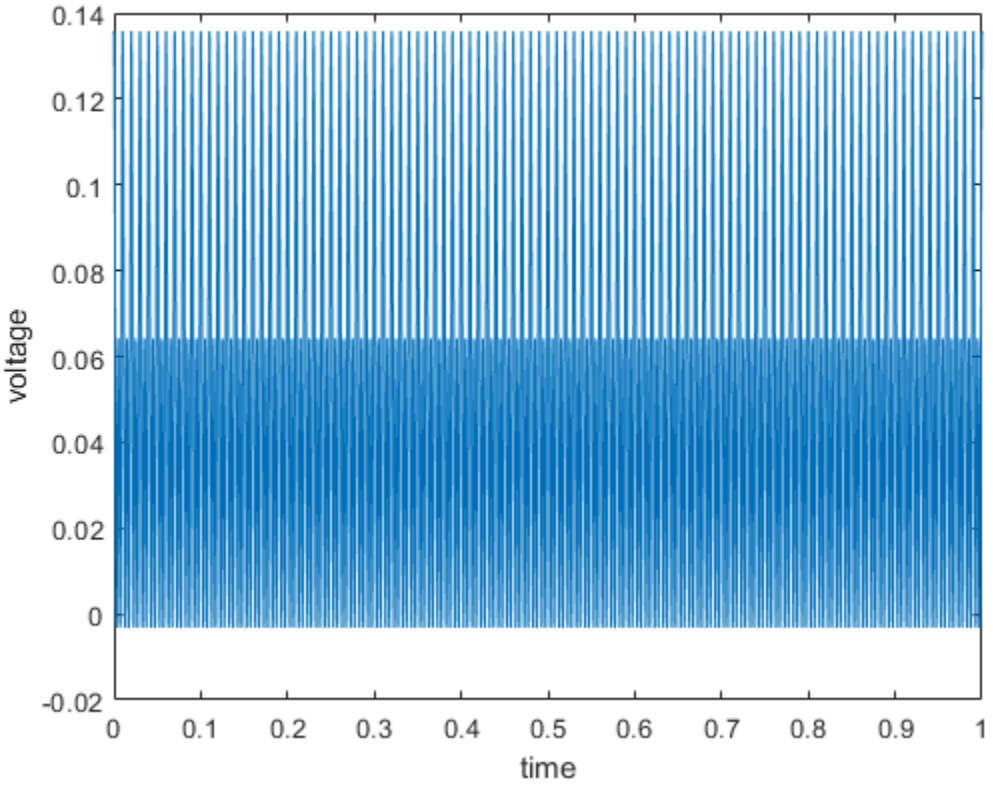

1000
800
600
400
200
0
-200
-400
-600
-800
-1000
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

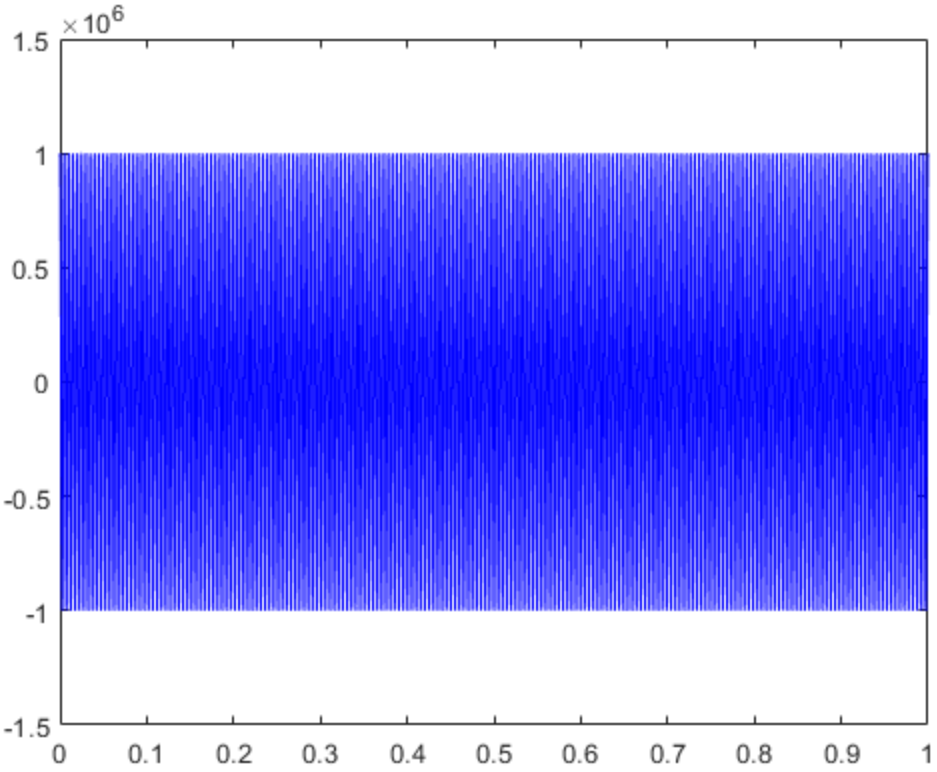

0.15
0.1
0.05
0
-0.05
-0.1
-0.15
voltage
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
time

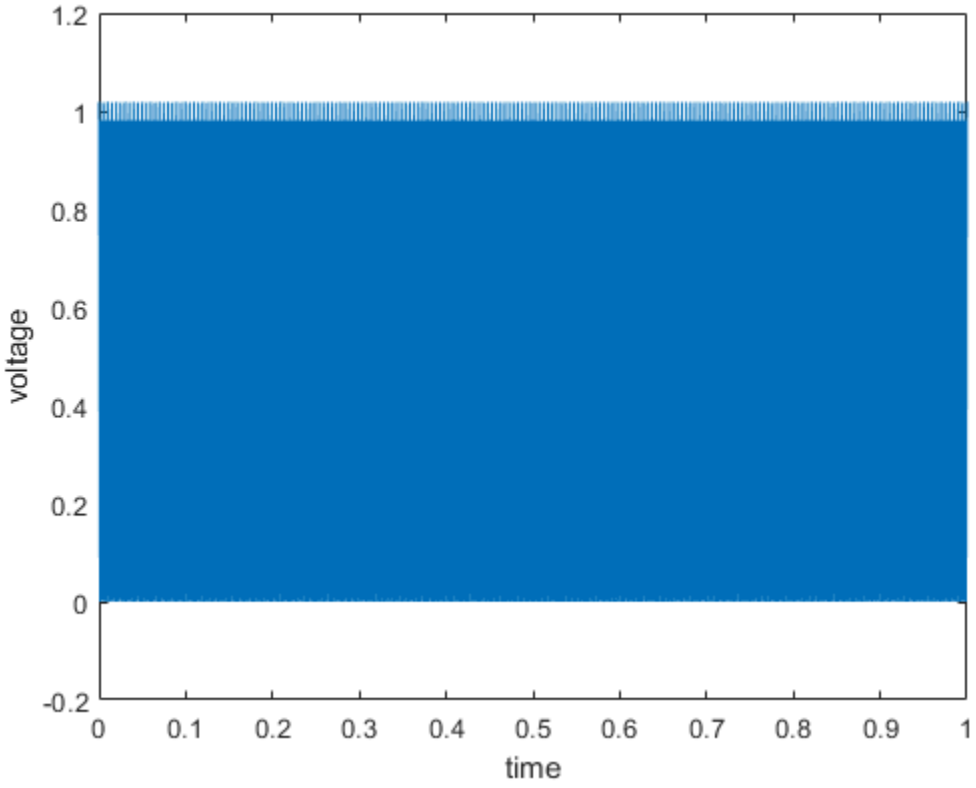

×10^4
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

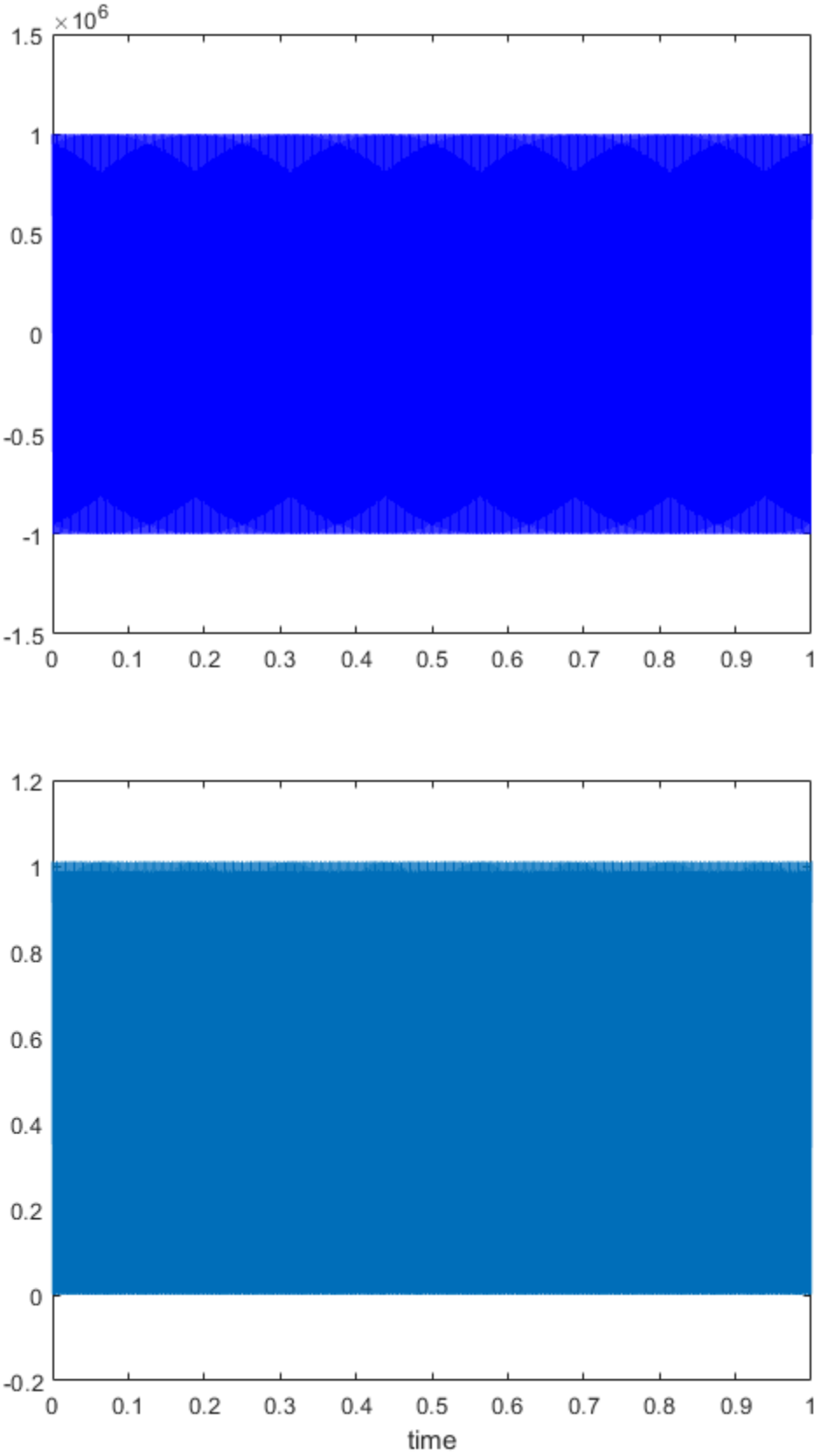

0.08
0.06
0.04
0.02
0
-0.02
-0.04
-0.06
voltage
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
time

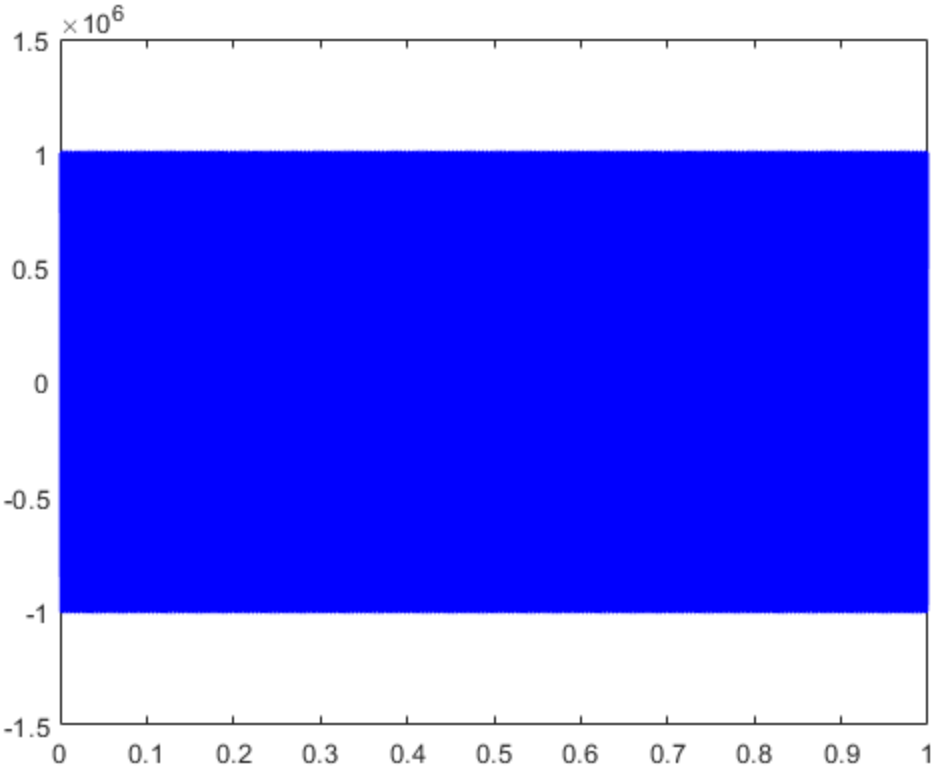

×10^5
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

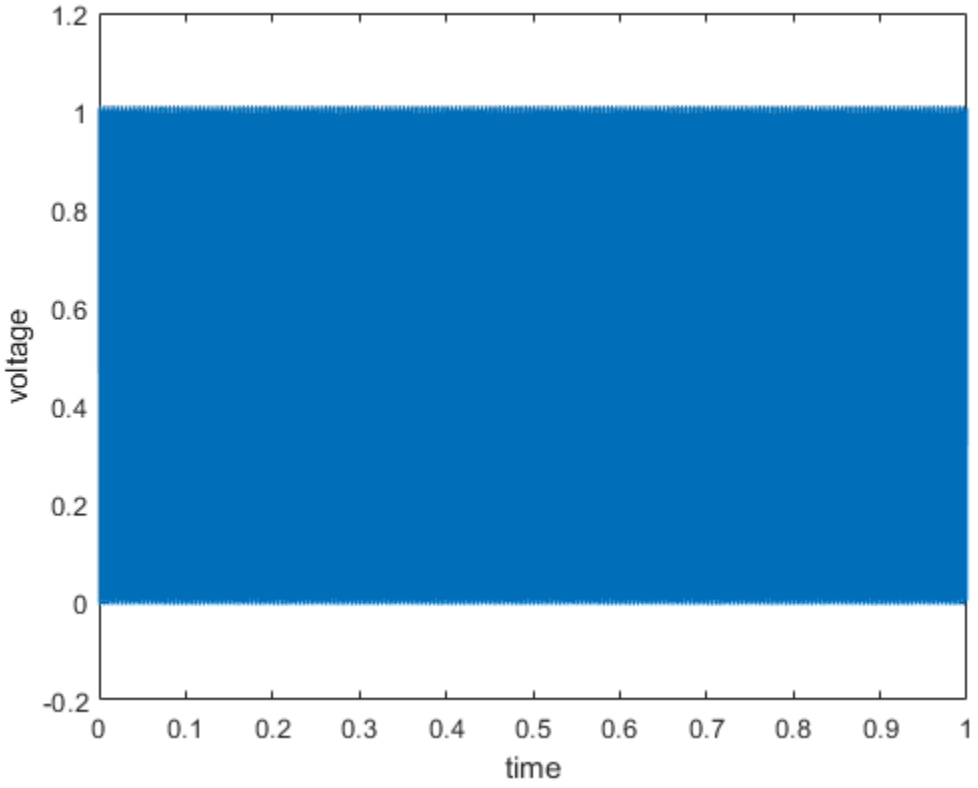

0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
-0.02
voltage
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
time


×10^6
1.5
1
0.5
0
-0.5
-1
-1.5
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1


1.2
1
0.8
0.6
0.4
0.2
0
-0.2
voltage
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
time


×10^6
1.5
1
0.5
0
-0.5
-1
-1.5
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
voltage
time


×10^6
1.5
1
0.5
0
-0.5
-1
-1.5
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1


1.2
1
0.8
0.6
0.4
0.2
0
-0.2
voltage
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
time

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