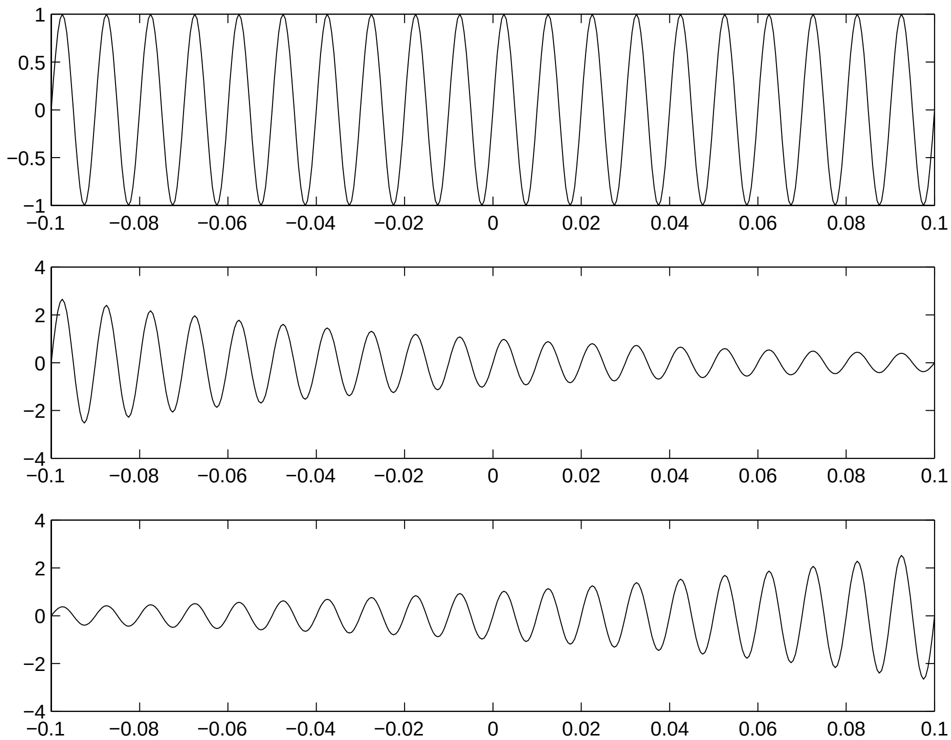

Figure C.4: Two plots of an impulse, generated by `plot` and `stem`.

C.1.2 Independent section

1. The sinusiodal term in each of these signals completes one cycle in 0.01 seconds. To get a reasonably smooth plot, we will need several samples in each cycle, say 20. Thus, we set

   ```
   >> t = -0.1:0.01/20:0.1;
   >> y1 = sin(2*pi*100*t);
   >> subplot(3,1,1), plot(t,y1)
   >> y2 = exp(-10*t).*sin(2*pi*100*t);
   >> subplot(3,1,2), plot(t,y2)
   >> y3 = exp(10*t).*sin(2*pi*100*t);
   >> subplot(3,1,3), plot(t,y3)
   ```

   The resulting plot is shown in figure C.4.

2. The specified sound is constructed as follows:

   ```
   t = 0:1/8000:1;
   n = exp(-5*t).*sin(2*pi*440*t);
   sound(n, 8000);
   ```

   It is a middle A (A-440), but with a sudden attack and a gradual, exponential decay.

3. The following program constructs the requested sound:

```
t = 0:1/8000:0.5;
n = []
for frequency = [494 440 392 440 494 494 494]
   n1 = exp(-5*t).*sin(2*pi*frequency*t);
   n = [n n1];
end
sound(n, 8000);
```

   It is the first few notes of "Mary had a little lamb."

4. (a)

$$sound\colon Vectors \to Sounds$$

   where *Vectors* is the set of row or column vectors of elements of *Double*.

   (b) *soundsc* has the same domain and range.

   (c)

$$plot\colon VectorPairs \to HorizontalSpace \times VerticalSpace.$$

   where

$$VectorPairs = \{Vectors_N \times Vectors_N \mid N \in Nats \text{ and } Vectors_N$$

   is a vector with N elements from *Doubles*.