

BIOEN 302 Homework 1 Solution

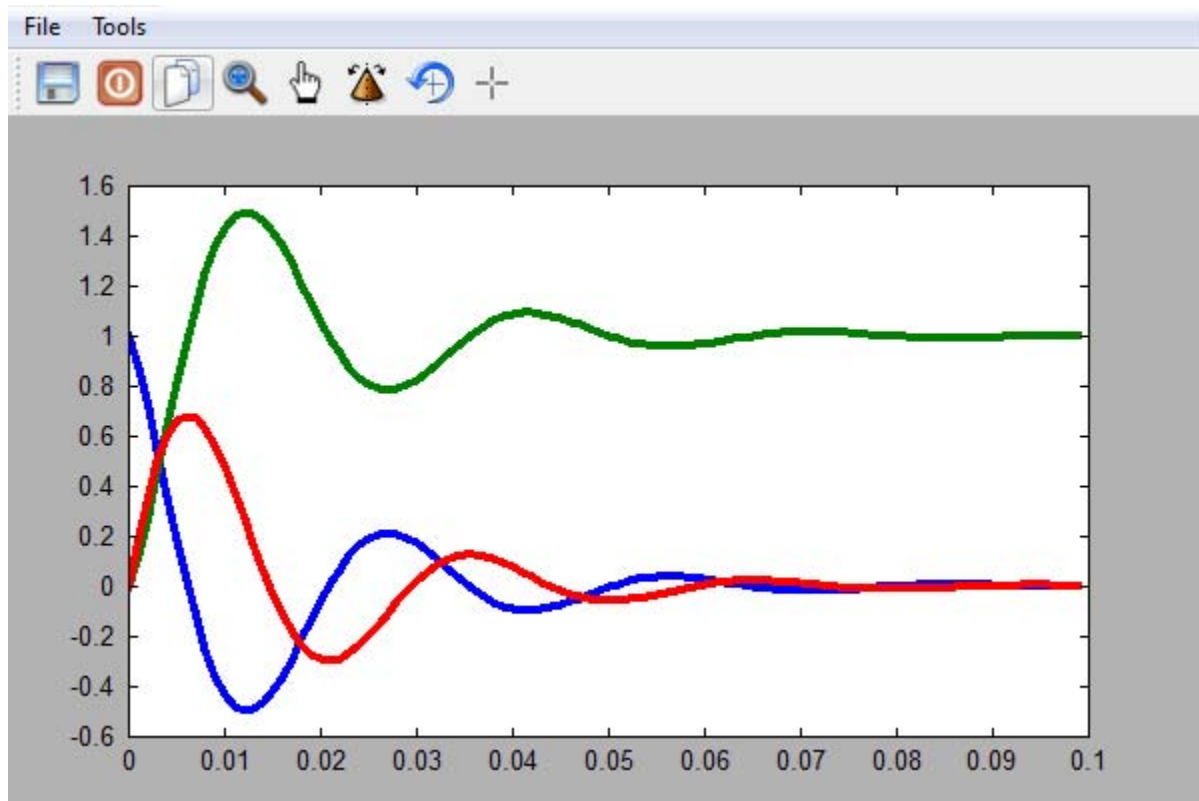
(e) Response Plots

MATLAB CODE

```
fs=1000;           % sampling frequency
N = 100;           % Number of points
t = (0:N-1)/fs;    % time axis

% nr is natural response
% sr is step response
% ir is impulse response
% all of the plots have been normalized

nr = exp(-56.8*t).*(cos(214*t)-.265*sin(214*t));
sr = 1-exp(-56.8*t).*(cos(214*t)-.265*sin(214*t));
ir = exp(-56.8*t).*sin(214*t);
plot(t,nr,t,sr,t,ir)
```



Blue is natural, green is step, and red is impulse response. The vertical axis is in millimeters.

The actual magnitude depends on what we mean by “unit” and you were given great leeway in your answer. However, if your answer was physically unreasonable (e.g. in meters) then we expected some explanation.