

Homework #8

Continuous-Time Signals and Systems

Assigned on Saturday, November 10, 2018

Due on Friday, November 16, 2018, by 5:00 pm via Canvas submission

Late homework is subject to a penalty of two points per minute late.

Reading: McClellan, Schafer & Yoder, *Signal Processing First*, 2003, Chapter 9.

Companion Web site with demos and other supplemental information: <http://dspfirst.gatech.edu/>

Web site contains solutions to selected homework problems from *DSP First*.

The e-mail address for Mr. Houshang Salimian (TA) is salimian.houshang@gmail.com.

Office hours for Mr. Salimian and Prof. Evans follow.

Note the change in Prof. Evans' Wednesday office hours from 2:00-3:00pm to 12:00-1:00pm.

<i>Time Slot</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
11:00 am		Salimian (EER 0.814 Table #4)		Salimian (EER 0.814A)	Salimian (EER 0.814D)
11:30 am		Salimian (EER 0.814 Table #4)		Salimian (EER 0.814A)	Salimian (EER 0.814D)
12:00 pm		Salimian (EER 0.814 Table #4)	Evans (EER 6.882)	Salimian (EER 0.814A)	Salimian (EER 0.814D)
12:30 pm		Evans (EER 1.516)	Evans (EER 6.882)	Evans (EER 1.516)	Salimian (EER 0.814D)
1:00 pm		Evans (EER 1.516)		Evans (EER 1.516)	
1:30 pm		Evans (EER 1.516)		Evans (EER 1.516)	
2:00 pm		Evans (EER 6.882)		Evans (EER 6.882)	
2:30 pm		Evans (EER 6.882)		Evans (EER 6.882)	
3:00 pm		Evans (EER 6.882)	Salimian (EER 1.810)	Evans (EER 6.882)	
3:30 pm			Salimian (EER 1.810)		
4:00 pm			Salimian (EER 1.810)		
4:30 pm					

Prof. Evans' coffee hours this week will be from 12:00-2:00pm on Friday in the EERC café.

EE 313 tutoring is available on Sundays through Thursdays from 7:00pm to 10:00pm in EER 0.814:

<http://www.ece.utexas.edu/undergraduate/tutoring>

1. Dirac Delta Blues. 25 points.

Signal Processing First, problem P-9.3, page 279. For part (b), please use

$$\int_{-\infty}^{\infty} \cos(100\pi t) [\delta(t) + \delta(t - 0.002)] dt$$

2. Continuous-Time Averaging Filter. 25 points.

Signal Processing First, problem P-9.17, page 282.

Please note that this system averages the input signal over a four-second interval of time from $t-2$ to $t+2$. If we were to multiply the result of the integral by $\frac{1}{4}$, then we would have a normalized averaging filter.

3. Continuous-Time Filtering. 25 points.

Signal Processing First, problem P-9.18, page 282. Please use $x(t) = u(t)$ instead of $x(t) = u(-t)$. Please plot $h(t)$, $x(t)$ and $h(t) * x(t)$.

By inputting a unit step function, we can obtain the step response. A step function models an event that was off before $t = 0$, turns on at $t = 0$ and stays on for $t > 0$. An example is turning on a light switch and leaving it on, or hitting the brake pedal and keeping the brake pedal pressed down.

4. More Continuous-Time Filtering. 25 points.

Signal Processing First, problem P-9.23, page 283.

Although not graded, please review the solution to problem 6.4 from fall 2017 at

<http://users.ece.utexas.edu/~bevans/courses/signals/homework/fall2017/solution6.pdf>

As stated on the course descriptor, "Discussion of homework questions is encouraged. Please be sure to submit your own independent homework solution."

NOTE: In your solutions, please put all work for problem 1 together, then all work for problem 2 together, etc. Please see additional homework guidelines on the homework page.

Please read the homework guidelines at

<http://users.ece.utexas.edu/~bevans/courses/signals/homework/index.html>