Problem Wk.4.2: Nano Quiz

This problem has been submitted previously; no changes will be saved.

Due date: 2/24, 9:50am

Do all parts of this problem and then click Submit. There is only one Submit button, you should only do that when you are finished with all the parts of the problem.

Do not try to start another log in, you will lose what you typed.

There is a limited checking budget (30 checks) on this quiz.

You have 15 minutes. You must click submit before:

2/24, 9:50am

Part 1: Constructing a Signal 1

Enter a Python class definition for the following Triangle signal, which takes a positive argument `h` which defines the height of the triangle. Your class should be a subclass of the Signal class, as defined in the software lab 3 handout.

The constructor `Triangle(h)` must produce a signal is equal to

- $h - |n|$ for $-h < n < h$
- 0 otherwise

note that $|n|$ is the absolute value of n.

```
class Triangle(Signal):
    def __init__(self, h):
        self.h = h
    def sample(self,n):
        if -self.h<n<0:
            return self.h+n
        if 0<=n<self.h:
            return self.h-n
        return 0
```

This is the answer we wrote:

```
class Triangle(Signal):
    def __init__(self, h):
        self.h = max(h,0)
    def sample(self,n):
        if (abs(n)>self.h):
            return 0
        else:
            return self.h-abs(n)
```

Part 2: Constructing a Signal from other Signals

Enter a Python expression (and set it equal to `trapezoid`), to construct the following signal.

`trapezoid`: the signal is equal to

- 0 for n <= 0
- 1 for n=1
- 2 for 2<=n<=6
- 1 for n=7
- 0 for n>= 8

Your answer should use the `Triangle` signal defined in Part 1, and any of: `ConstantSignal`, `UnitSampleSignal`, `CosineSignal`, `StepSignal`, `SummedSignal`, `ScaledSignal`, `R`, `Rn` and `polyR` (defined in software lab 3 handout). If you need to construct a polynomial, use `poly.Polynomial([...])`.

```
# Use any of: Triangle, ConstantSignal, UnitSampleSignal, CosineSignal,
StepSignal,
# SummedSignal, ScaledSignal, R, Rn and polyR (defined in sw 4 handout).
# They are all defined for you already.

trapezoid = SummedSignal(Rn(Triangle(4),4),-1*Rn(Triangle(2),4))
```

This is the answer we wrote:

```
trapezoid = SummedSignal(SummedSignal(Rn(Triangle(2),2),
                                      Rn(Triangle(2),4)),
                         Rn(Triangle(2),6))
# Another way of doing it.
#trapezoid = polyR(Triangle(2), poly.Polynomial([1, 0, 1, 0, 1, 0, 0]))
```

Part 3: Enable Submit

Current time is: **3/1/2011, 9:12pm**

Click Submit before: **2/24, 9:50am**

The Check button will update the current time.

Enter Done below

[ ] ⊗

and click Submit.

If this problem is submitted past the due time, this subproblem will be marked incorrect.

24 checks left (Check)

(Get Answers)

6.01SC Introduction to Electrical Engineering and Computer Science
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