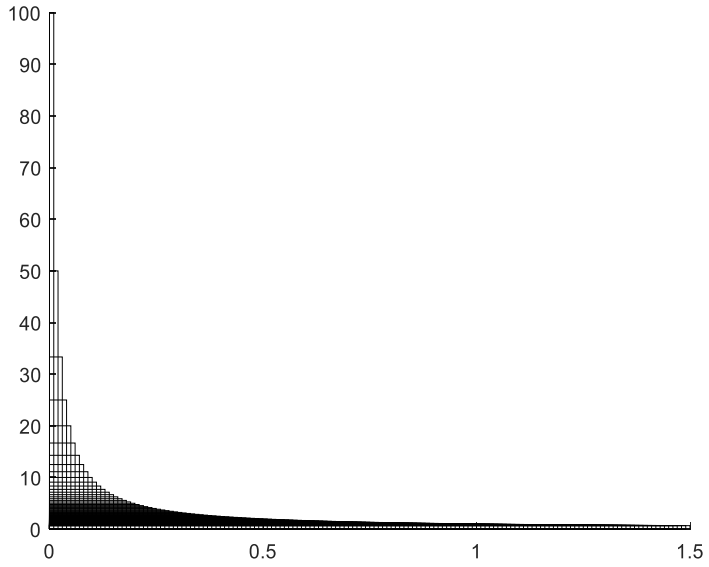
Aaron Gross

Chapter 8

Question 1: What is the entropy of a pdf whose function is a delta function: delta(x)?

My approach was to approximate a delta function using a uniform distribution of width a and height $\frac{1}{a}$ and take the limit as $a \to 0$:



From eq. 8.2 we have

$$h(X) = \log(a)$$

for the above distribution. As we let $a \to 0$, h(x) grows increasingly negative, eventually reaching $-\infty$ at $a = 0$:

-7.0131	-7.1309	-7.2644	-7.4186	-7.6009	-7.8240	-8.1117	-8.5172	-9.2103	-Inf

Matlab Code:

```
figure(1); clf;
h = [];
i = 1;
for a = 1.5:-.01:0
    p_a = 1/a;
    h(i) = log(a);
    rectangle('Position', [0 0 a p_a]);
    hold on;
    i = i+1;
```

```
end
%%
h_2 = [];
i = 1;
for a = 1:-.0001:0
    p_a = 1/a;
    h_2(i) = log(a);
    i = i+1;
end
```