CSDS 440: Assignment 4

Shaochen (Henry) ZHONG, sxz517

Mingyang TIE, mxt497

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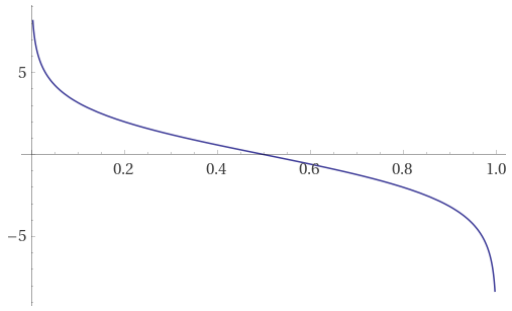
Problem 15

Say we have X being a Bernoulli r. v. Let $P(X = 1) = p$ and $P(X = 0) = 1 - p$ we know that its entropy would be:

$$H(X) = H_b(p) = -p\log_2(p) - (1-p)\log_2(1-p)$$
$$\Rightarrow H_b'(p) = \log_2(1-p) - \log_2(p)$$

Now plot the function.



With the first derivative being a decreasing function, we know the function is concave.