## 1. Assignment 2

The coin toss experiment has two outcomes, H and T . In the following problems, the experiment consists of repeating the coin toss until the first heads is obtained. The assignment consists of constructing a probability triple ( $S, \Sigma, \mu$ ) that represents the experiment.
1.1. Problem 1. Let $S$ be the set of all possible outcomes of the experiment. Write a definition for $S$.
1.2. Problem 2. Define a $\sigma$-algebra $\Sigma$ on $S$, that is, a collection $\Sigma$ of subsets that is closed (stable) under countably many set operations (unions, intersections, and compliments).
1.3. Problem 3. Define a countably additive set function $\mu: \Sigma \rightarrow$ $[0,1]$ with the property that $\mu(\emptyset)=0$ and $\mu(S)=1$.
1.4. Problem 4. Let $E$ be the event that the coin first comes up heads on an even numbered trial. Find $\mu(E)$.

