IEOR151 Lab 2

1. Suppose we are interested in the burning rate of a solid propellant used to power aircrew escape systems; burning rate is a random variable that can be described by a probability distribution. Suppose that our interest focuses on the mean burning rate. Specifically, we are interested in deciding whether or not the mean burning rate is 50 cm/s.

    a. What is the null hypothesis and alternative hypothesis?

    b. Suppose that a sample of n=10 specimens is tested and that the sample mean burning rate $\bar{x}$ is observed. If $48.5 \leq \bar{x} \leq 51.5$, we will not reject the null hypothesis, and if either $\bar{x} < 48.5$ or $\bar{x} > 51.5$, we will reject the null hypothesis in favor of the alternative hypothesis. Suppose that the standard deviation of burning rate is $\sigma = 2.5$ cm/s and that the burning rate has a distribution for which the conditions of the central limit theorem apply. Find the type I error.

    c. How to reduce type I error?

    d. Find the type II error when the true mean is 52 cm/s?

    e. How to reduce type II error?

    f. If $\bar{x} = 51.8$, compute the P-value; if significance level $\alpha = 0.05$, accept or reject H_0?