

CHAPTER OVERVIEW

6: Basic Inferences

The purpose of this chapter is to introduce two basic but powerful tools of inferential statistics, the *confidence interval* and the *hypothesis test* (also called *test of significance*), in the simplest case of looking for the population mean of a quantitative RV.

This simple case of these tool is based, for both of them, on a beautiful and amazing theorem called the *Central Limit Theorem*, which is therefore the subject of the first section of the chapter. The following sections then build the ideas and formulæ first for confidence intervals and then for hypothesis tests.

Throughout this chapter, we assume that we are working with some (large) population on which there is defined a quantitative RV X . The population mean σ_X is, of course, a fixed number, out in the world, unchanging but also probably unknown, simply because to compute it we would have to have access to the values of X for the entire population.

Strangely, we assume in this chapter that while we do not know μ_X , we do know the population standard deviation σ_X , of X . This is actually quite a silly assumption – how could we know σ_X if we didn't already know μ_X ? But we make this assumption because it makes this first version of *confidence intervals* and *hypothesis tests* particularly simple. (Later chapters in this Part will remove this silly assumption.)

Finally, we always assume in this chapter that the samples we use are simple random samples, since by now we know that those are the best kind.

[6.1: The Central Limit Theorem](#)

[6.2: Basic Confidence Intervals](#)

[6.3: Basic Hypothesis Testing](#)

[6.4: Exercises](#)

[6.5: Bibliography](#)

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