

# HYPOTHESIS TESTING IN NON-STANDARD SITUATIONS

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Hypothesis testing, that allows to check the validity of a model, the efficiency of a drug, the appropriateness of an economic policy, etc., is at the very heart of daily statistical practice. In standard situations, the mathematical theory of hypothesis testing is essentially complete and the performance of the corresponding statistical procedures is well understood. In this lecture, we will consider hypothesis testing in two non-standard situations. The first one is associated with the “high-dimensional” case, where many variables are recorded on a relatively small number of observations. The second one relates to a setup where the underlying distribution is close to a singularity of the model. We will identify the mathematical/statistical challenges raised by such cases and see how they can be addressed. We focus mainly on illustrations in directional statistics, that is, in problems where observations are on unit hyperspheres.