

Part I

Anatomy and Function of the Linear Cochlea

Part I starts with a short introduction into the historical development of today's views of anatomy and function of the cochlea, and its role as the “front end” in auditory processing, or hearing.

It then presents results of some classical measurements of mechanical parameters, and of dynamical cochlear responses to sound. The relevance of these responses is illustrated with examples from classical auditory psychophysics.

The next step concerns the development of cochlear mechanics analysis and modeling during the 20th century. The first steps appeared around 1925, but the field expanded strongly after 1950. The mathematical—biophysical approach remained mostly linear until the late 1970s, even though several nonlinear auditory phenomena were well known.

The initial study of the linear cochlea is relevant because

- It gives a proper introduction to the mathematical and biophysical concepts that are in use in the field
- Current insight in analysis of complex systems is largely based on tools from linear signal analysis
- And finally, major developments started with the analysis of a linear cochlea.

In the mean time we have learned that linear cochleae only describe cases of severe hearing loss, and that the healthy cochlea is strongly nonlinear. Those properties are treated in Part II.