# Chapter 2

# ANALYSIS AND MODELING OF TL DATA

**Abstract** In this chapter we provide detailed R codes which show how researchers can analyze and model their experimental TL data. We provide R codes for the initial rise method and the method of various heating rates, which allow evaluation of both the activation energy E and the frequency factor s . We present R codes for numerically integrating the simple one trap one recombination model (OTOR), as well as for numerically integrating the equations for first, second and general order kinetics using R. We discuss the general one trap (GOT) differential equation and its analytical solution, which is based on the Lambert *W* function. Several examples are given for using computerized glow curve deconvolution analysis (CGCD) for single-peak and multiple-peak TL glow curves, based on the R-packages *tgcd* and the Lambert *W* function. Specific examples are given of using the new R package *RLumCarlo*, to simulate TL glow curves with different kinetic parameters. The chapter concludes with a list of recommended experimental protocols, which experimentalists can apply when studying TL signals.