# Brute force BKT

In the Brute force analysis, we try every single possible combination of the four parameters of Bayesian Knowledge tracing (given a parameter grain-size). In accordance with recommendations in Corbett & Anderson (1995), the guess and slip are bounded to be below 0.3 and 0.1 respectively, in order to avoid model degeneracy (cf. Baker, Corbett, & Aleven, 2008). In this search, parameter estimates are obtained for each of the skill. To find the best fitting parameter estimates for each skill *Si*–all the potential parameters combinations in the grain size of 0.01 are tried. For each of the parameter combinations, the sum of squared residuals (SSR) is calculated by iterating through all of the students’ actions, who have answered the Skill *Si*. The combination which gives the best SSR will be the best fitting parameter estimate for the Skill *Si.*

***Note****: This class expects input file to be tab delimited and sorted on Skill and then on Student (please see the example TestData.txt for format)*

Calculation of SSR for each combination of Lzero, T, Guess, Slip:

*LikelihoodCorrect* is calculated, for each student action. After that *LikelihoodCorrect* is subtracted from the studentAction and squared to get the Squared residual (SR) and then SR is summed to get SSR. The equations for these calculations are:

Depending on the student’s action is set by using the below mentioned formula

= (when “RIGHT”)

=(When “WRONG”)

References:

1. Corbett, A.T., Anderson, J.R. (1995) Knowledge Tracing: Modeling the Acquisition of Procedural Knowledge. User Modeling and User-Adapted Interaction, 4, 253-278.
2. Baker, R.S.J.d., Corbett, A.T., Aleven, V. (2008) More Accurate Student Modeling Through Contextual Estimation of Slip and Guess Probabilities in Bayesian Knowledge Tracing. Proceedings of the 9th International Conference on Intelligent Tutoring Systems, 406-415.