Similar principles apply to the concept of parameter identification, a form of optimization problem that aims to reduce residuals in observable data and output from concurrent simulations by selecting specified constraints. The optimization problem of parameter identification might be difficult to solve for complicated situations due to the wide range of inputs. Finding the ideal answer is difficult as a result. To maximize is to attain the best outcomes without compromising anything else.

There are several techniques that may be used for parameter identification. Here are just a handful of those techniques:

* Least squares method
* Output Error Method
* Equation error method
* Genetic Algorithms
* Extended Kalman filter

**Least squares method:** The method of least squares is a widely used technique in regression analysis to approximate the solution of overdetermined systems by minimizing the sum of the squares of the residuals (a residual is the difference between an observed value and the fitted value provided by a model), which are made in the results of each individual equation (sets of equations where the number of equations exceeds the number of unknowns).

**Output Error Method:**The strategy's ability to do away with the need to simulate the disturbances is a key component. The parameter estimations are obtained by minimizing a certain loss function. When there is simply measurement noise and no other types of noise in the data, the output error approach is a maximum likelihood estimator.

**Equation error method:** The cornerstone of this method is the least amount squares concept, which is also known as the equation error method. Equation error method (EEM) minimizes a quadratic value perform of the error within the (state) equations to estimate the parameters. Their management inputs and derivatives are assumed to be immediately available or precisely measured. The equation error method is simple, quick, and effective for systems that are linear and linear-in-parameter.

**Conclusion:**

The Least Squares approach is the simplest and most popular way for choosing parameters, according to the methodologies. It is suggested because finding the best solution that produces the least sum of squared errors is typically the simplest. The least squares approach often explains where the line of greatest fit is located among the data points being studied. To make the least squares concept more practical in reality, various modifications including the instrumental variable technique, generalized least squares, extended least squares, and square root filtering have emerged, especially for recursive, online applications employing digital computers.