

Parameterization

In a model, quantity A is modelled. A is influenced by unknown B. Parameterization is to express B using A and/or other known quantities, such that A can be estimated. Parameterization schemes usually consist of parameters to be determined empirically.

Example, we model population density ρ using model (conservation equation) $d\rho/dt = s$, where s is birth-death rate, but unknown. Because of this, the model is not “closed”. Since s is too difficult to estimate, we express s using ρ , e.g., $s = r \rho$, where r is a parameter. The model is now

$$d\rho/dt = r \rho$$

which is the Malthus (1798) population growth theory. We use parameterization to describe our understanding of the processes. It is a vital technique for representing cross-scale and cross-compartment interactions in complex systems. (YS, 12.06.2024).

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