

The **good regulator** is a theorem conceived by Roger C. Conant and [W. Ross Ashby](#) that is central to [cybernetics](#). It is stated that "every good regulator of a system must be a model of that system".^[1] That is, any [regulator](#) that is maximally successful and simple must be [isomorphic](#) with the system being regulated. This result is obtained by considering the [entropy](#) of the variation of the output of the controlled system, and shows that, under very general conditions, that the entropy is minimized when there is a [mapping](#) from the states of the [system](#) to the states of the [regulator](#). The minimum is obtained when the map is an [isomorphism](#), that is, when the regulator models the system.

With regard to the brain, insofar as it is successful and efficient as a regulator for survival, it must proceed, in learning, by the formation of a model (or models) of its environment.

The theorem is general enough to apply to all regulating and self-regulating or [homeostatic systems](#).

The theorem does not explain what it takes for the system to become a good regulator. The problem of creation of good regulators is addressed by [practopoietic](#) theory.

When restricted to the ODE (Ordinary Differential Equations) subset of [control theory](#), it is referred to as the [internal model principle](#), which was first articulated in 1976 by B. A. Francis and W. M. Wonham.^[2] In this form, it stands in contrast to classical control, in that the classical [feedback loop](#) fails to explicitly model the controlled system (although the classical controller may contain an implicit model).^[3]

See also

- [Analogy#Mathematics](#)
- [Variety \(cybernetics\)](#)
- [Practopoiesis](#)
- [Internal model \(motor control\)](#)
- [W. Ross Ashby](#)

References

- ¹ Conant and Ashby, "[Every good regulator of a system must be a model of that system](#)", *Int. J. Systems Sci.*, 1970, vol **1**, No 2, pp. 89–97
- ² B. A. Francis and W. M. Wonham, "[The internal model principle of control theory](#)", *Automatica* **12** (1976) 457–465.

3. [^] Jan Swevers, "[Internal model control \(IMC\)](#)", 2006

External links

- [Daniel L. Scholten discusses in his "Every Good Key Must Be A Model Of The Lock It Opens"](#)
- [The Good-Regulator Project](#) by Daniel L. Scholten



Last edited 4 months ago by an anonymous user

