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Bio-automation - A Control Theory View of Human Body System

MAU Jochen, Professor (em) of Heinrich Heine University Düsseldorf, Germany

With human body system under a holistic perspective at physiological levels, an engineering view puts focus on structural aspects in human body design which is motivated by its life sphere roles in environmental habitat and social spaces.

Functional body can be decomposed into *functional core body* of vital functions and *functionally extended body* of physical productivity and 'reproductivity' (= reproductive activity); it must be supplemented by *behavioral body* for a person's operations in environment and social spaces.

A '*factory concept*' can be invoked as a gateway to more detailed decomposition of functional body in top-down modeling, assigning dedicated functional roles to 'aggregates' of functional units at organ level. By the '*Kybernetik paradigm*', the structure of couplings (*Schaltgefüge*) between a system's components can be described without regard to their material realization. Such way, analogies between human whole-body system and technical systems that are comparable by functional diversity and complexity of control structures can provide guidance in studying energy (mass, information) transfer dynamics between human body system components in a holistic approach.

Complex adaptive systems with highly interwoven feedback loops across many levels of hierarchy are known to involve mathematically almost intractable nonlinear dynamics; then, a technique of *in silico* experimentation said to be successfully used in politics and economics, 'agent-based modeling', should also be applied in holistic approaches to mathematical modeling of the human body system.