An Abstract Scheme of Design

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Design can be taken as human-being's activity for realizing desire in the objective world. In engineering design, desire is mostly expressed as functions of a target entity, and a function of an entity is specified by behavior of the entity. Since physical attributes of an entity determine its behavior, design is possible if we know the relation between functions and attributes of entities. The concept of functions belongs to our knowledge world, and attributes are inhabitants of the real physical world. Thus, in design, a flow of information takes its rise from our knowledge world to the real world. This is a general scheme of design, and it is also applicable to many sort of human-being's activities of problem-solving. Based on the theory of Information Flow by Barwise and Seligman [1], we give a mathematical model of the design scheme in order to abstract common futures of problem-solving phenomena and formulate them into a mathematical theory [2].

[1] Barwise, J. and Seligman, J., Information Flow – The logic of distributed systems. *Cambridge Tracts in Theoretical Computer Science 44, Cambridge University Press*, 1997.

[2] Kakuda, Y. and Kikuchi, M., *Abstract Design Theory*, in preparation, 2000.

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