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Innoduction

Innoduction is a kind of logical inference that has been identified as pertinent to *innovative design*.

Innoduction can be distinguished by its form of *modus ponens*: $q; p \Rightarrow q, p$

This is noted in [Eek00] as essential for *innovative* design, and it "presupposes intuition."

Notice there are two conclusions and only one premise. *Intuition* is alleged to be that which fills the gap between the premise and the conclusions.

Roozenburg [Roo02] explains that if $p \Rightarrow q$ were a premise (as is the case with abduction), then p must already exist. Therefore abduction cannot produce new ideas; i.e., no innovation.

However, I think this argument is flawed for two reasons:

1. It assumes there is such a thing as a "new" design idea. (I think there is not any such thing.)
2. It assumes no *lemma*-like reasoning occurs during the premises of an abductive argument (i.e., that in the course of stating $q, p \Rightarrow q$ as premises of an abductive argument, no other reasoning occurs to identify p.

With respect to the 1st reason, it may be simply a search through known principles, ideas, and other designs - possibly/probably aided by analogical reasoning.

With respect to the 2nd reason, consider these steps:

1. establish q (p1 of an abductive argument);
2. search for new idea p (the *lemma*-like step);
3. determine if $p \Rightarrow q$ (a test step);
4. establish $p \Rightarrow q$ (p2 of an abductive argument);
5. determine p as the conclusion of the argument.

See Also

Deduction, Induction, Abduction

References

Eek00. **a** J. Eekels. 2000. **On the fundamentals of engineering design science: The geography of engineering design science. Part 1.** *J. Eng. Design,* 11(4):377-397, 2000.
Roo02. **a** Roozenburg, N.F.M. 2002. **Defining synthesis: on the senses and the logic of design synthesis**. In *Engineering Design Synthesis: Understanding, Approaches and Tools*. A. Chakrabarti, ed.

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