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Mathematics and Mechanical Engineering: The symbiosis and the parasitism.

In the mechanical engineering industry, the mathematical modeling is being used commonly enough, so it is often not regarded as a mathematical modeling. Sometimes, the mathematical part is just not recognized, and sometimes, it is intentionally concealed to not to scare people away. But also, the waterfall of mathematical vocabulary is a well-tested method to get around uncomfortable questions. This has several interesting consequences, of which I would like two to be pointed out.

First, the symbiosis: Mathematics offers a logical structure, that, if employed properly, is able to reflect the physical phenomena and the technical expertise. Such structure can be used to predict behavior beyond to what is actually observed. Of course, such approach has several deficiencies, arising from adoption of known or unknown assumptions, limited technical expertise, limited knowledge of the “real” physical world, and disregard to “non-mathematical” and “non-logical” nature of what we observe. All these can be reckoned in result interpretation, the resulting model can be tested, and used to produce countless gains.

Second, the parasitism: Mathematics, or at least the sound of it, is used as a superstitious ritual. In many ways this is similar to the Cargo Cult phenomenon. There is a general belief that mathematics has the “power” to bring good-enough solutions and conclusions. So, by using the mathematical rituals, that include calculating the average, designing various metrics, presenting graphs, the solution is believed to actually (and suddenly) appear. Unlike in the case of the Cargo Cult, that have not seen a landing plane, the misleading bit in our case is that the more or less plausible conclusion is reached sooner or later. And when this happens, there is little motivation to look back to scrutinize if under a competent calculation this still would be the case. It is needless to say that such approach leaves quite a mistrust to mathematics and, especially, the statistics, when one learns to “only trust the conclusions faked by myself”.