Applied Compositional Thinking for Engineers (ACT4E)

Session 6 - Trade-offs

Questions & Answers

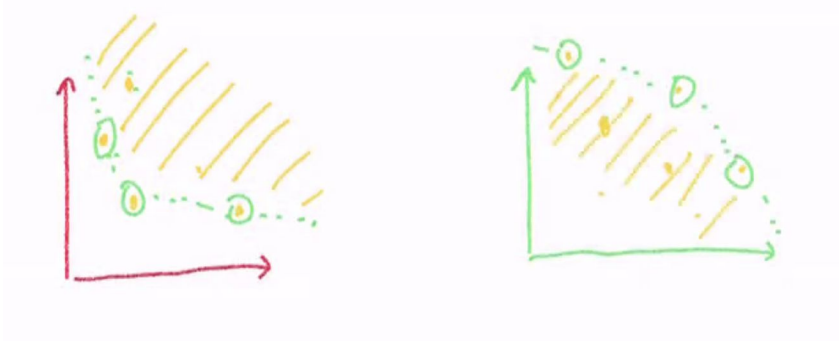
Q: So maybe we should clarify if relations R go between sets, or are endorelations on a set.

JL: A relation R is, for us, always a subset of a cartesian product X x Y of sets. Endorelations are a special case where X = Y. So, for example, the endorelation “less-than-or-equal” is an “endorelation on the set X = {real numbers}”, which means we can describe it as a subset of X x X, i.e. a relation between X and itself.

Q: there is typically a maximal feasible cost and minimal feasible functionality also?

GZ: As a designer, you can specify what is the maximum cost you are willing to pay and what is the minimum functionality you want to achieve. This wish might lead to some design solutions, but also to a statement of infeasibility (e.g., I want an autonomous car which reaches 100 km/h but I am willing to pay max 10 USD)

For a general discussion, we will introduce important concepts in the next lectures, which allow for a clear understanding of the following cost/trade-offs picture



MH: It is the idea of having an upper bound on the cost graph on the left, and a lower bound on the right graph

Q: doesn’t scaling mean the dominant product can both have more features and be cheaper?

JL: What is meant by scaling?
MH: Cost of production per unit decreases a lot as total production size increases.
JL: Ah, thanks, I see what is meant by scaling.
NM: I wonder if this might be representable in terms of monoidal categories (taking multiple tensor products of your physical product could be related to economy of scale, I think this would appear in resource theories)