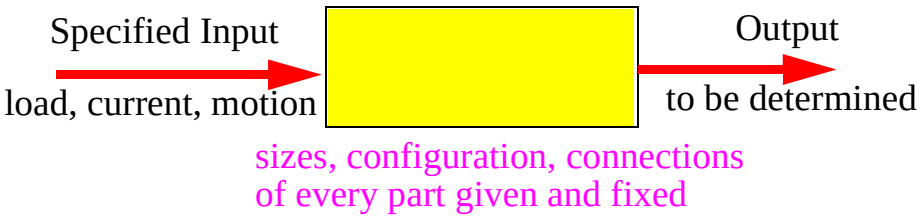
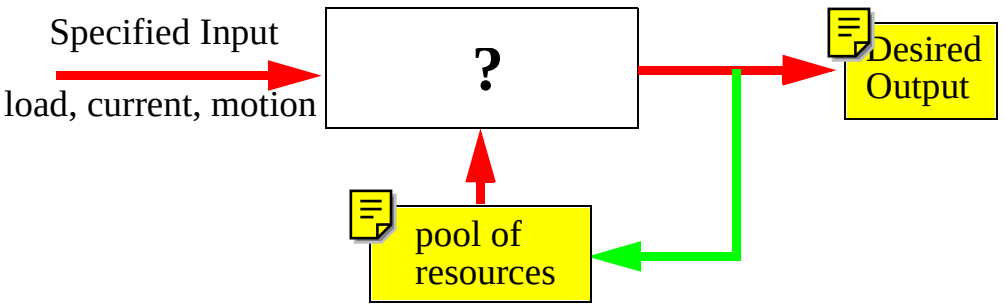
- Course Objectives
  - Introduce the design of engineering systems as a systematic and well organized activity
  - Use the methods of mathematical optimization as design tools.
  - Introduce interaction of various engineering disciplines during design optimization - Multidisciplinary Design Optimization -.
  - Use *Mathematica* as an engineering tool.

- Engineering Analysis versus Design
  - Analysis



  - Design



- Goal of the design engineer is to develop the best possible system, consistent with the resources allocated for the project, to perform a prescribed job.

“If you don’t do the best you can with what you happened to have got, you will never do the best you might have done with what you should have had”

- Optimum Design: Determination of the best feasible combination of system variables according to a pre-selected quantitative measure of effectiveness.

- Steps of Design
  - Define functional requirements.
  - Conceptual design - Limited analysis -
  - Preliminary design - Analysis with idealized models -
  - Detailed design - Accurate analysis tools -
  - Testing and verification
  - Iteration between various steps is often requited
- Design optimization
  - Detailed and Preliminary design stages
  - A limited optimization in Conceptual design stage