

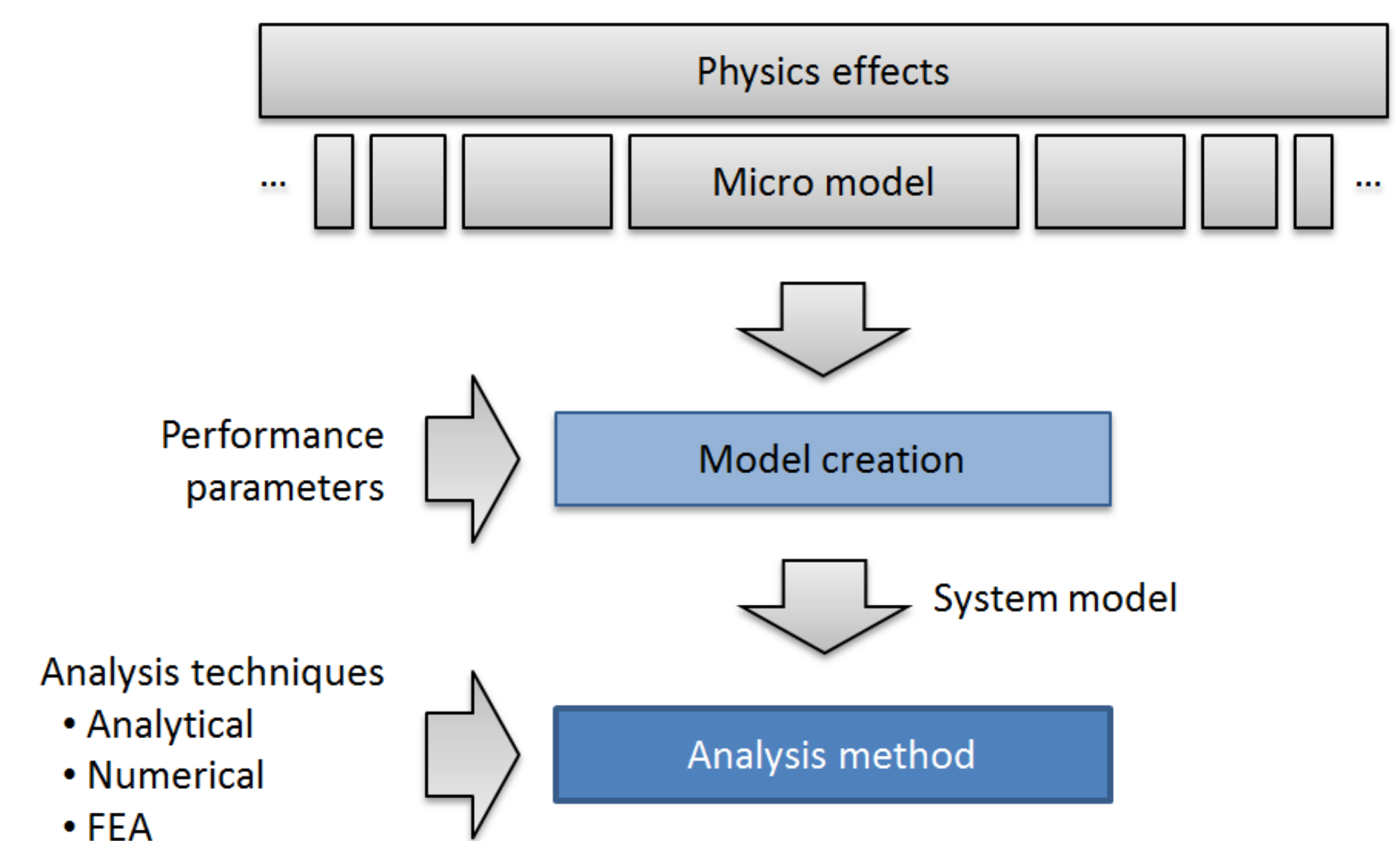
From fundamental principles to analysis methods

PROBLEM Competitive product development faces the challenge of including novel technologies often requiring a new understanding of physical phenomena. Industry must assimilate interesting applicable technologies and implement them into their current product design processes, in a rapid and efficient manner.

CHALLENGE Technical products are formed by integration of multiple technologies into an embodiment, where technologies encompass the grouping of parameters and design components. These fundamental principles must be understood first, to identify important design parameters. For an efficient design process, technologies should be easily implementable or interchangeable into a current product. Analysis methods, describing the interactions between parameters and the quality of components, guide this design process.

APPROACH

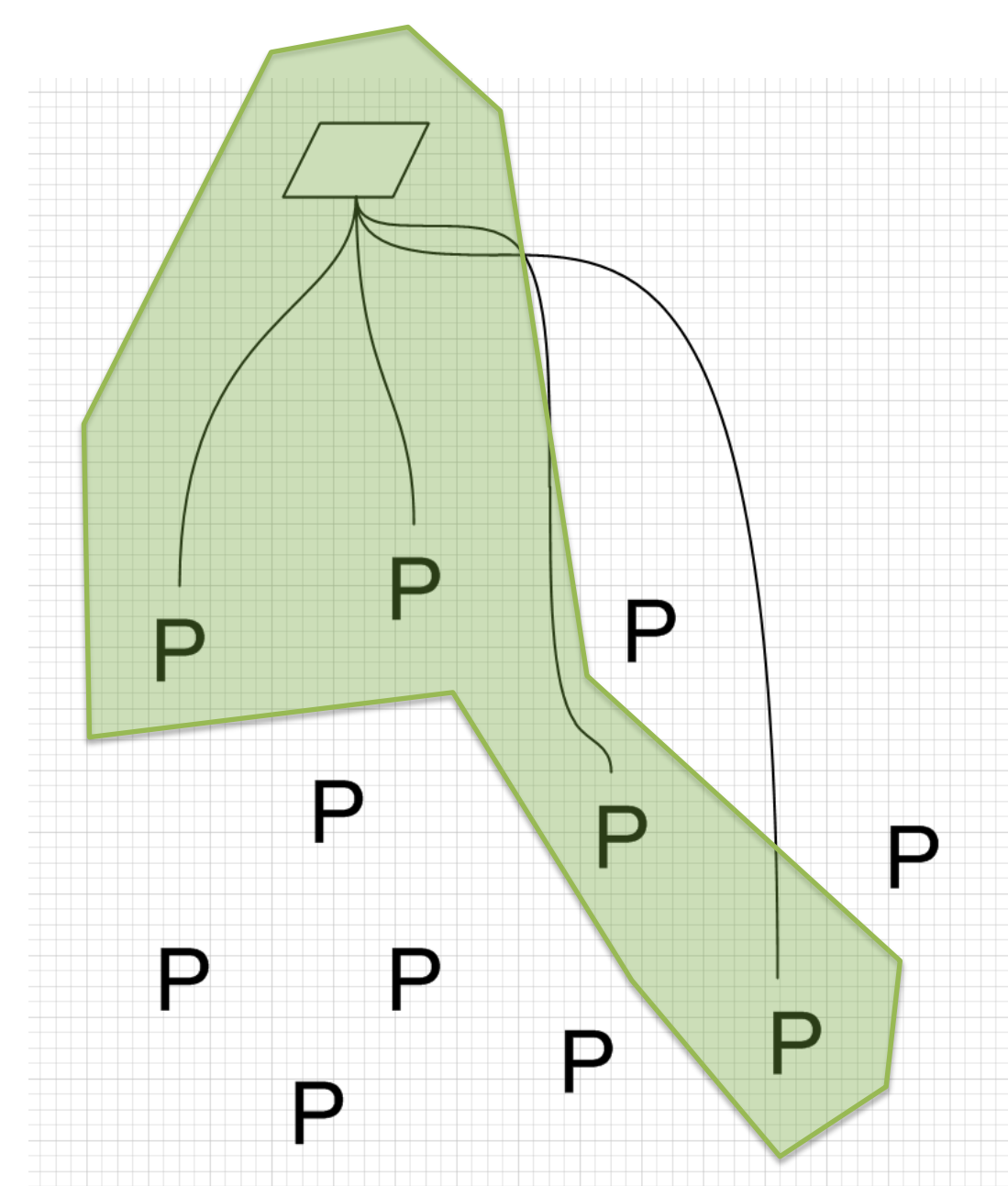
1. Understand physical principles (literature, internet study).
2. Find key parameters influencing the quality of components.
3. Construct analysis method (linking design parameters).



EXAMPLE

$$\frac{d\hat{p}}{dt} = -\frac{i}{\hbar}[\hat{H}, \hat{p}] - \frac{\gamma}{2}[\hat{q}, [\hat{q}, \hat{p}]] + \sqrt{\gamma}W\{\hat{q} - \langle \hat{q} \rangle, \hat{p}\}$$

$$\bar{q} = \langle \hat{q} \rangle + \frac{1}{2\sqrt{\gamma}}W$$



4. Implement new method in current product design process:
 - a) Substitute improved technology with current technology
 - b) Insert new technology into current structure

5. Manage new (multidisciplinary) parameter couplings.
6. Look for improvement potential by integrating functional parts in components.

