

# Research on Quantitative Intelligent Systems and Their Applications to Design, Planning and Manufacturing

*Zuomin Dong, Professor*

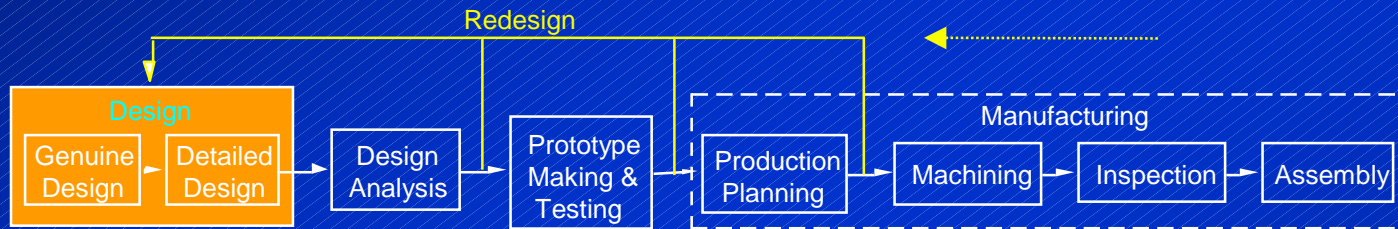
*Department of Mechanical Engineering*

# Past and Present Research

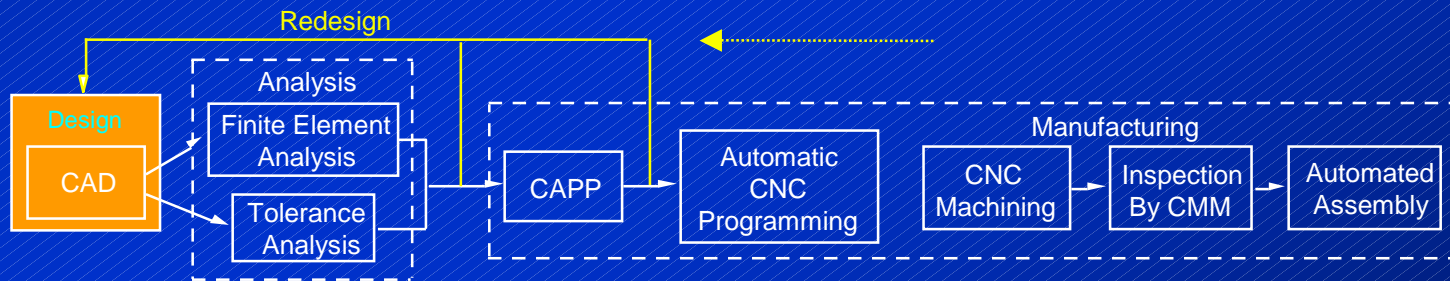
- **Design Automation and CAD**
  - Quantitative Concurrent Engineering Design
  - Computer-Automated Tolerancing
  - Virtual Prototyping Based Design Optimization
- **Advanced Manufacturing**
  - Planning and Programming of Sculptured Part Machining
  - Dynamic Traffic Control Using a Fuzzy Intelligent System and Optimization
- **Next Generation Fuel Cells**
  - Optimal Design of Fuel Cell Components, Stack and System
  - Development of Innovative, Radiator Stack Fuel Cell Architectures
  - Rapid Prototyping of Fuel Cell Gas Delivery Plates
- **Applications of CAD, Optimization and Intelligent Systems**

# Sequential Product Development Activities

(high costs and long lead times)

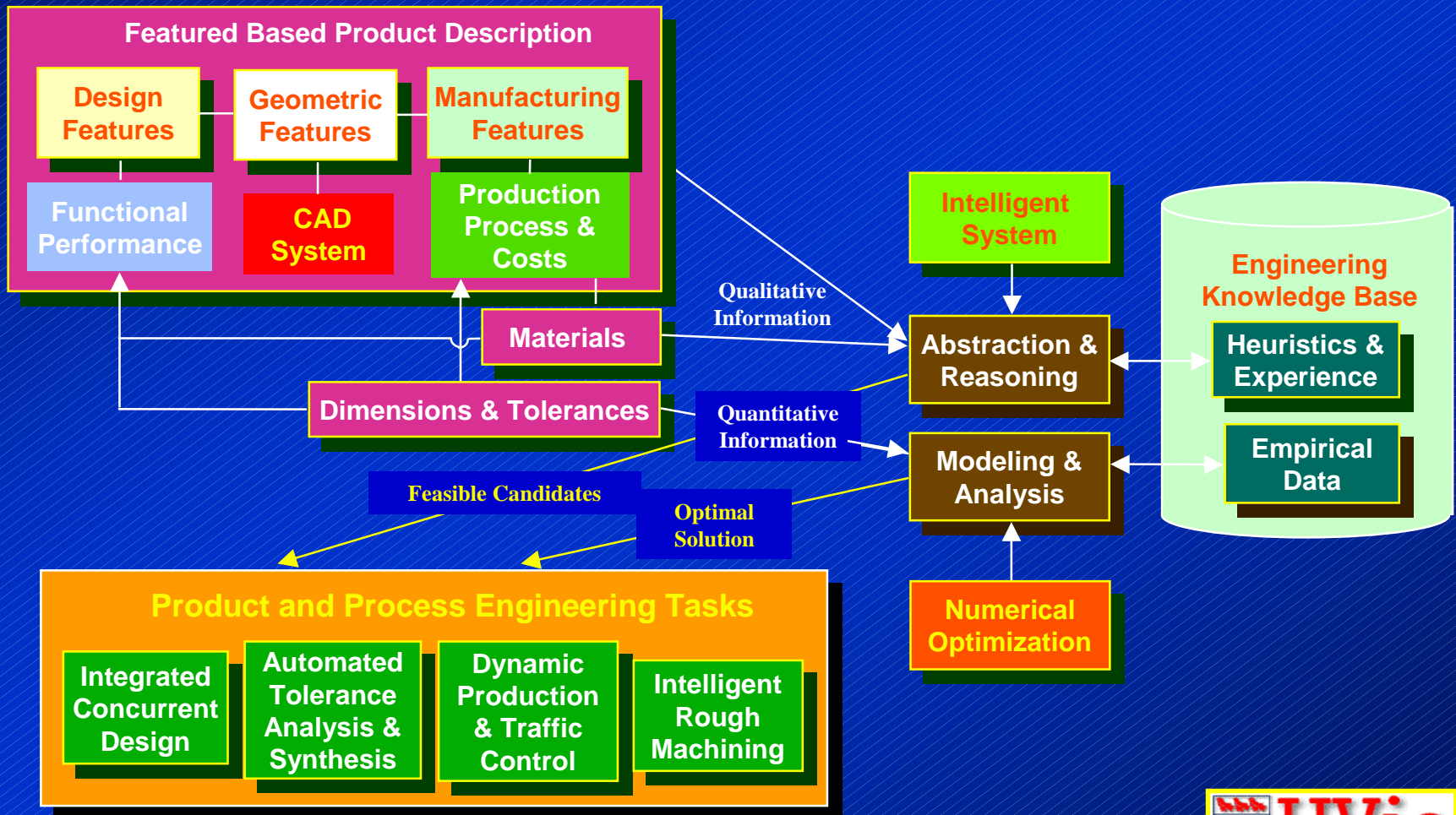


(a) Traditional Practice



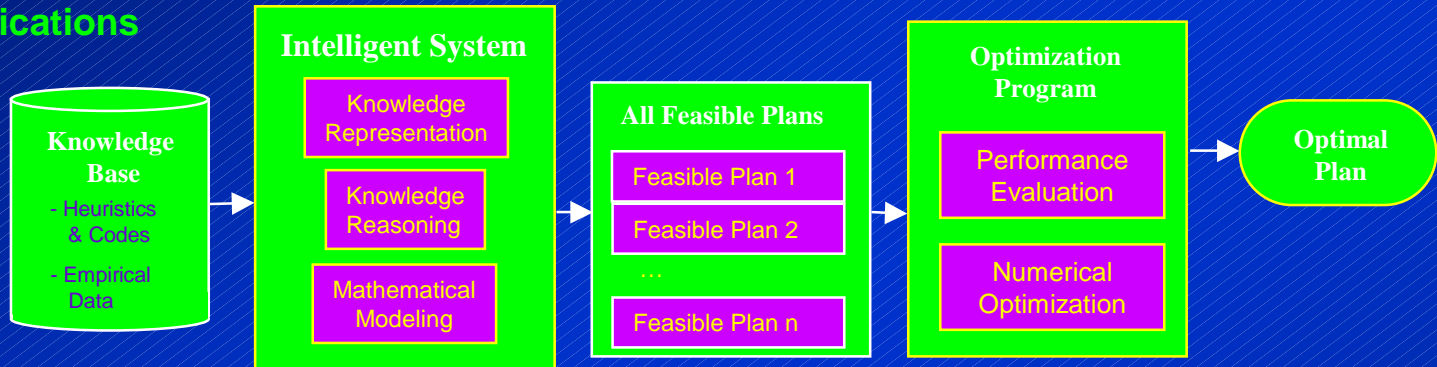
(b) Present Approach

# Concurrent Product and Process Engineering in CAD/CAE/CAM Applications



# Two Different Implementations of QIS

## Off-Line Applications



## On-Line Applications

