

Computational Intelligence for Control System Design Automation

Nowadays, control systems designers are accustomed to modern techniques and high-tech scientific tools to compute controllers and analyse their stability, performance and robustness, among many factors. A lot of effort is employed until the specifications are accomplished. Does the design finish there? This work suggests that consistency (specifications fulfilment) and internal flexibility (compatibility margins) are both important in the design process. To gain insight into internal flexibility, Computational Intelligence elements can be combined in an automated mechanism. The product of the evolutionary simulation based on that mechanism are quality designs, with better and better combinations of actuation effort, stability margins, robustness, and so on. This environment, called Control System Design Automation, does not come to replace the human designer, but to provide a “second opinion” during the design process. To illustrate that synergy, two examples are presented: a satellite model and a benchmark problem. For both, benefits and advantages are vigorously evident.