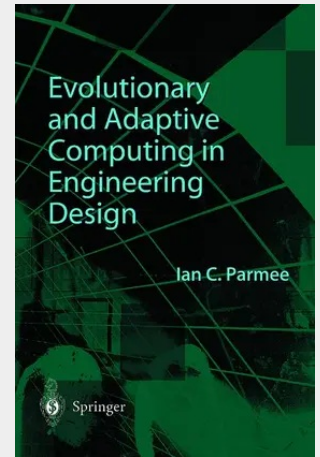


Evolutionary and Adaptive Computing in Engineering Design

Prior to the early 1990s the term 'evolutionary computing' (EC) would have meant little to most practising engineers unless they had a particular interest in emerging computing technologies or were part of an organisation with significant in-house research activities. It was around this time that the first tentative utilisation of relatively simple evolutionary algorithms within engineering design began to emerge in the UK. The potential was rapidly recognised especially within the aerospace sector with both Rolls Royce and British Aerospace taking a serious interest while in the USA General Electric had already developed a suite of optimisation software which included evolutionary and adaptive search algorithms. Considering that the technologies were already twenty-plus years old at this point the long gestation period is perhaps indicative of the problems associated with their real-world implementation. Engineering application was evident as early as the mid-sixties when the founders of the various techniques achieved some success with computing resources that had difficulty coping with the population-based search characteristics of the evolutionary algorithms. Unlike more conventional, deterministic optimisation procedures, evolutionary algorithms search from a population of possible solutions which evolve over many generations. This largely stochastic process demands serious computing capability especially where objective functions involve complex iterative mathematical procedures.

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