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FORMAL CONSTRUCTION AND GENERATION OF ALGORITHMS

HAIHE SHI

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Abstract: Recently trustworthy software has been proposed and advocated by many countries and many academic communities. As the core of computer software, algorithm, especially its reliability and productivity, plays a critical role in both trustworthiness and application of software. Formal method and automation of algorithms have been shown to be important ways to improve the reliability and productivity of various algorithms. Yet, due to the creativity involved, algorithm formal method still remains to be one of the field's most challenging problems. Its use so far within the software development community has not been commensurate with its potential. Therefore, it is necessary to explore the laws during algorithm design and to propose new techniques. Here series of our work will be presented, including a unified and practical formal approach and its supporting platform, algorithm development rules/strategies and prototype system, sorting algorithms via formal component product line assembly, and algorithm design through the optimization of reuse-based generation via category theoretical semantic. Also, some recent ongoing works will be introduced.