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Turing Universality of DNA Self-Assembly Models at Temperature 1

Self-assembly is a bottom-up process in which a small number of components *automatically* assemble together to form a more complex structure. Winfree introduced the Tile Assembly Model (TAM) as a simplified mathematical model of the DNA self-assembly, in which a tile may be added to the growing structure if the total interaction with its neighbors exceeds a parameter *Temperature*. An interesting question is whether TAM at temperature 1 is Turing Universal, i.e., it can simulate an arbitrary Turing machine. We investigate the computational power of some variants of TAM and will show that with simple modifications Turing Universality is achievable.