



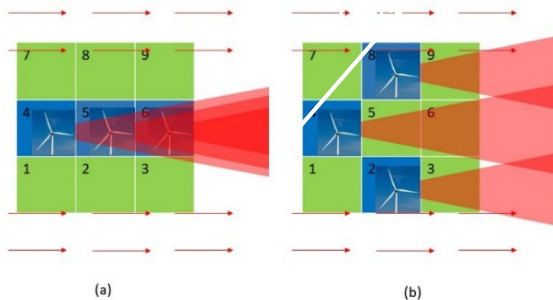
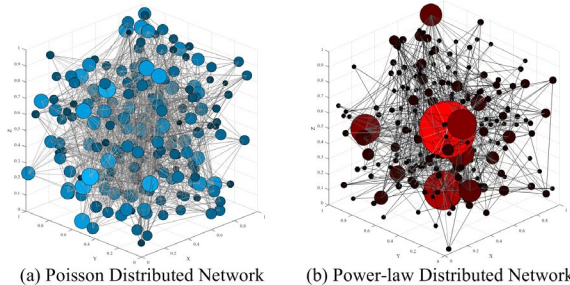
Faculty of
Science and
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Analysis and Applications of Metaheuristics Utilizing Complex Systems

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Research 1 :

The algorithm generates complex networks with Poisson or power-law distributions.



Wind Turbine
Layout
Optimization:
From Fig. (a)
to Optimized
Fig. (b).

Research 2 :

Information
Compression
via Chaotic
Transcription
Inspired by
Biological
Gene
Transcription.

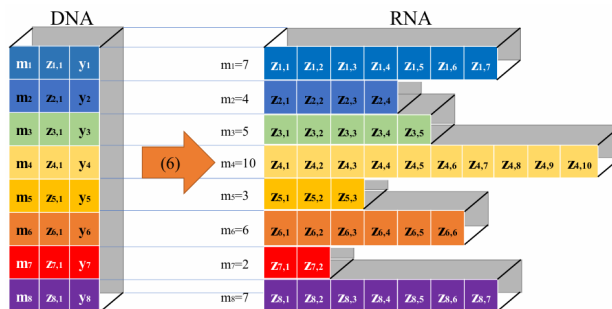


Fig. 2 The transcription process from DNA to RNA.

Content:

Metaheuristic algorithms (metaheuristics) efficiently provide high-quality approximate solutions for complex optimization problems in a short time.

Research 1: This study utilizes complex network theory to characterize metaheuristic search processes, identifying algorithms suited to specific problems. Preliminary applications to wind turbine layout optimization in wind farms achieved results surpassing those from MIT. Future work aims to build a generalizable framework for effective metaheuristic selection and improvement.

Research 2: A dynamic strategy introducing chaotic maps into genetic representations enables flexible element optimization, improving diversity and expanding the scope of variable-length metaheuristics. Applied to dendritic neuron model optimization, the method significantly reduced computational resources in classification tasks.

Keywords : metaheuristics, Complex Systems

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