

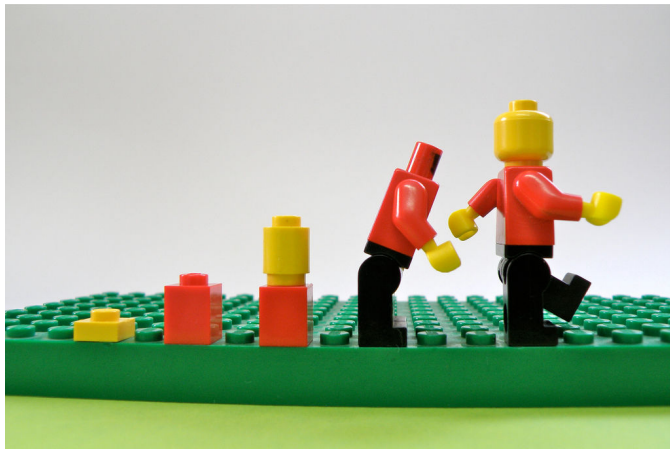
Grid-based Metaheuristics Applied to Nuclear Fusion

Antonio Gómez-Iglesias

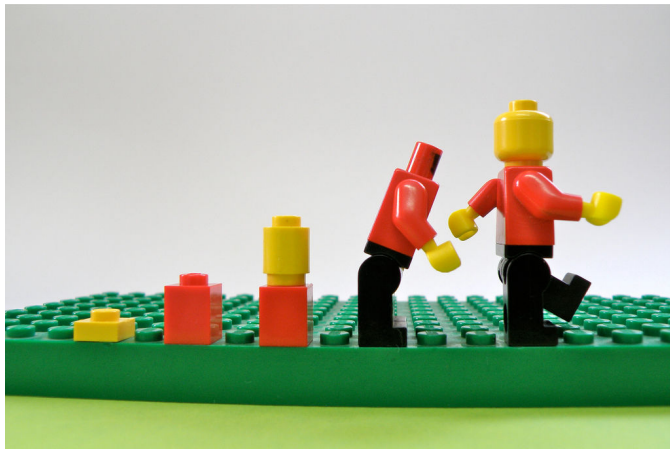
Genetic Algorithms

Evolutionary Algorithms

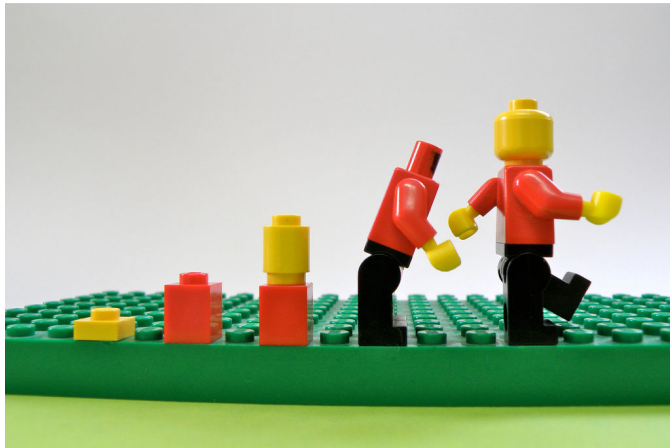
Artificial Bee Colony



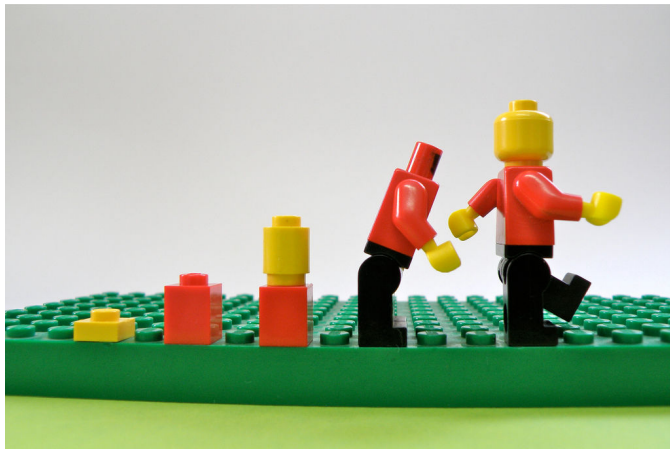
1. Who?



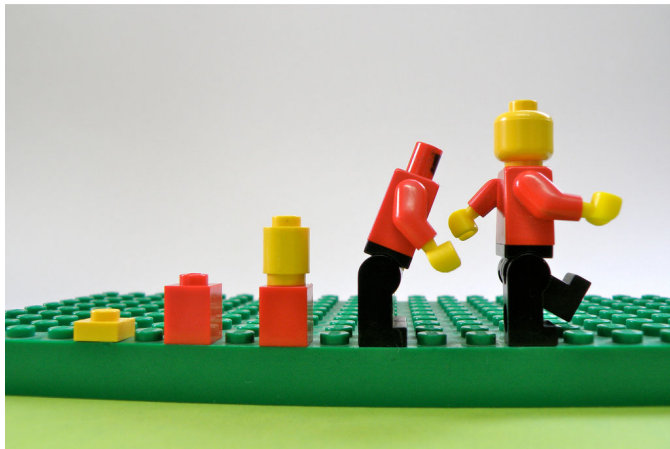
1. Who?
2. What?



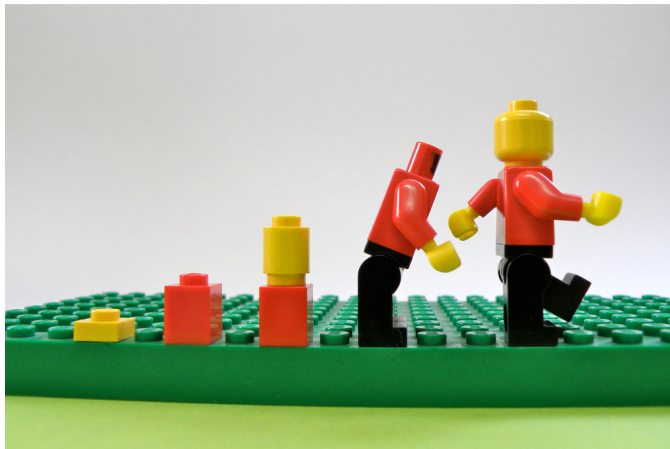
1. Who?
2. What?
3. **When?**



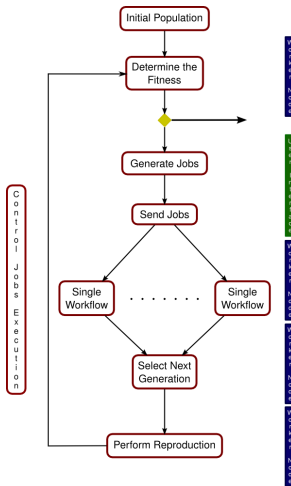
1. Who?
2. What?
3. When?
4. **Where?**



1. Who?
2. What?
3. When?
4. Where?
5. **Why?**



1. Who?
2. What?
3. When?
4. Where?
5. Why?
6. **How?**

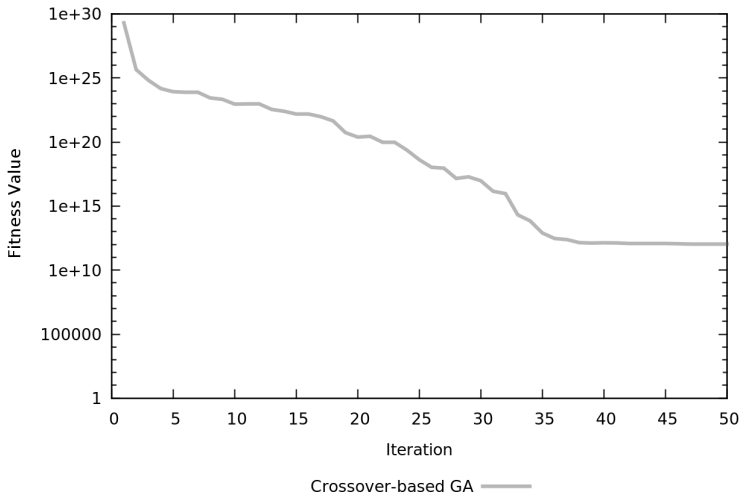


Ideas

- Chromosome: configuration parameter.
- Individual: configuration.
- Generation: set of individuals.

Cross-based GA

- New individual: crossing parents' chromosomes.
- Huge population size.
- Master-slave.

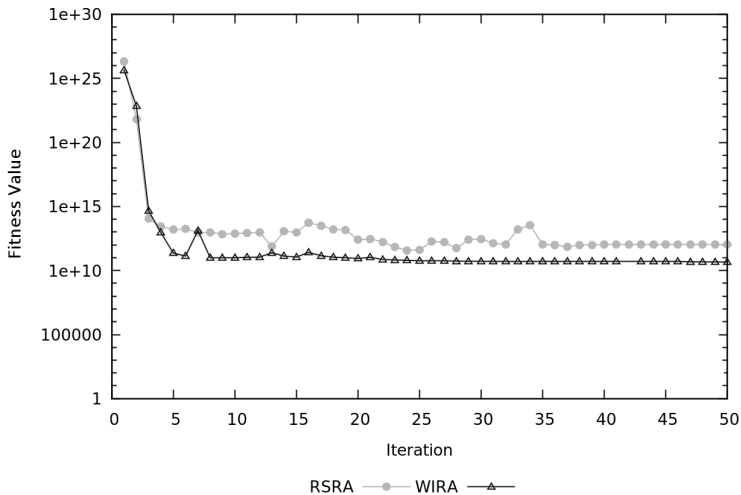


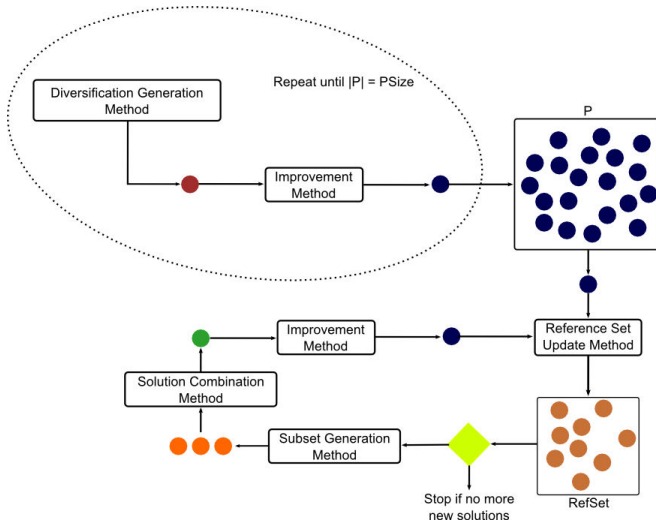
Ideas

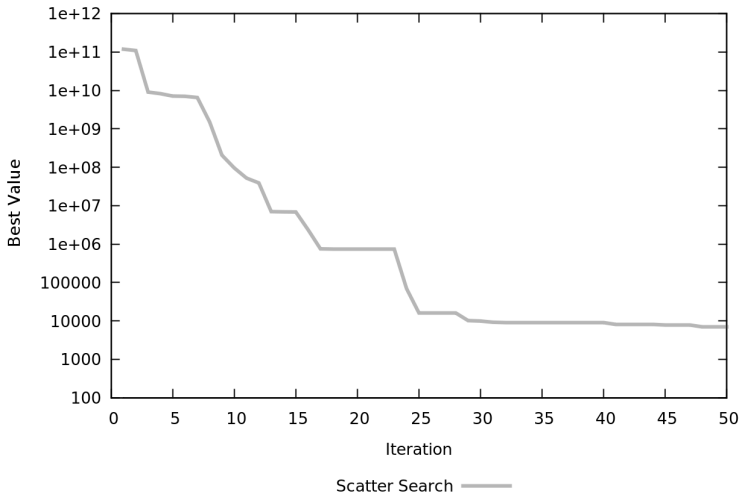
- New individual: mutation of parents' chromosomes.
- Smaller population size, still huge.
- Master-slave.

Two models:

- RSRA: random selection and replacement.
- WIRA: random selection, sorted replacement.









- Bees?



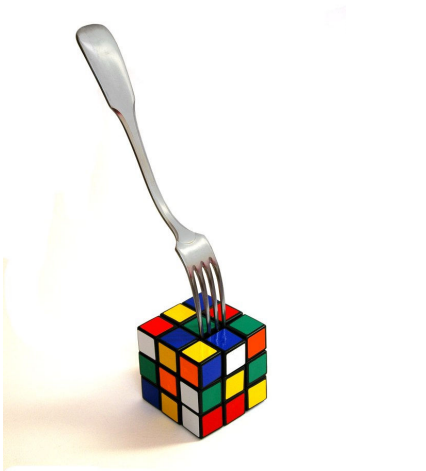
- Bees?
- Grid?



- Bees?
- Grid?
- **Fusion?**

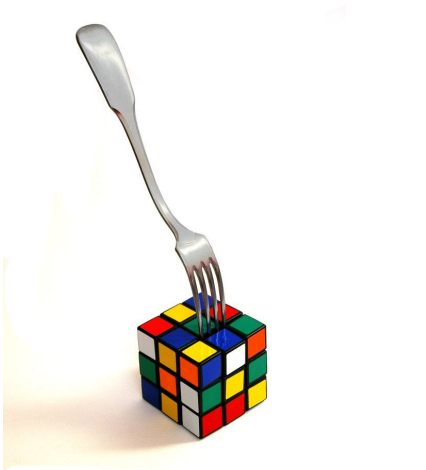
Problems of the previous techniques

- **Iterative models**



Problems of the previous techniques

- Iterative models
- **Bottlenecks**



Problems of the previous techniques

- Iterative models
- Bottlenecks
- **Long execution time**



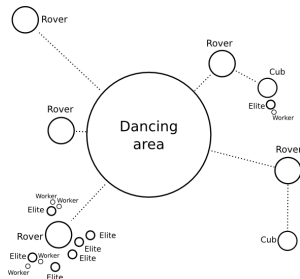
Problems of the previous techniques

- Iterative models
- Bottlenecks
- Long execution time
- **Adaptation of existing algorithms**



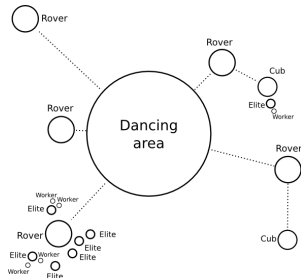
Characteristics of ABC

- **Asynchronous and distributed**



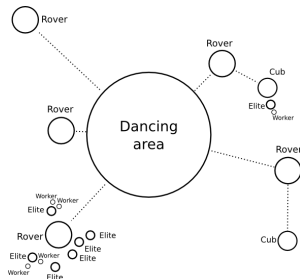
Characteristics of ABC

- Asynchronous and distributed
- **Different bees, different techniques**



Characteristics of ABC

- Asynchronous and distributed
- Different bees, different techniques
- **Diversity and convergency**



Characteristics of ABC

- Asynchronous and distributed
- Different bees, different techniques
- Diversity and convergency
- **Better use of the resources**

