Ant Colony Optimization

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Our Parameter Choices

number_of_ants = 10

- number of ants did not seem to have a big influence

pheromone_evaporation_rate = 0.1

pheromone_intensification = 0.5

choose_best_rate = 0.1

Three Modules

adapting the probability-distribution:

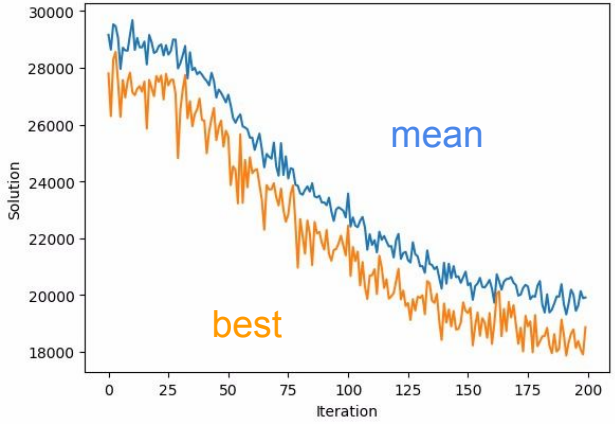
$$p_{ij} := \frac{\tau_{ij}^{\alpha} \cdot \eta_{ij}^{\beta}}{\sum_{z \in S} \tau_{iz}^{\alpha} \cdot \eta_{iz}^{\beta}} \quad \forall j \in S$$

Module 1: alpha = 1 beta = 1*(1 - beta_decrease_rate)$^{number\_of\_iteration}$

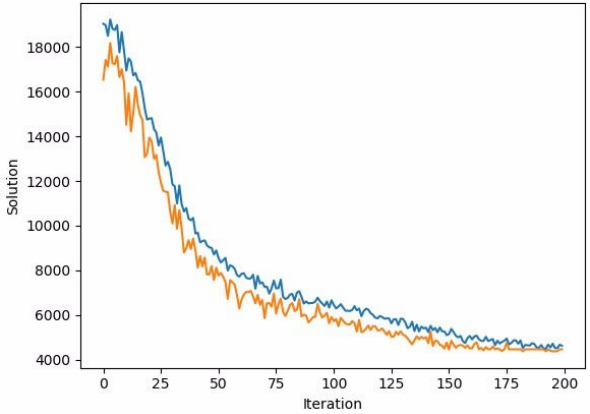
Module 2: alpha = 1 beta = 0

Module 3: alpha = 1 beta = 1

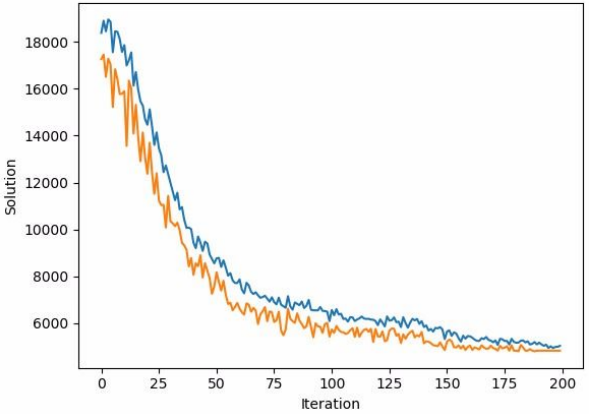
TSP 1



Beta=0

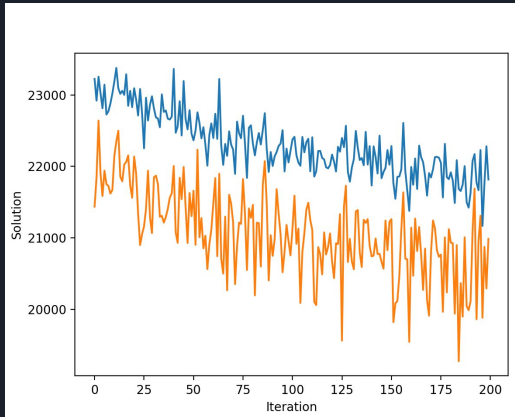


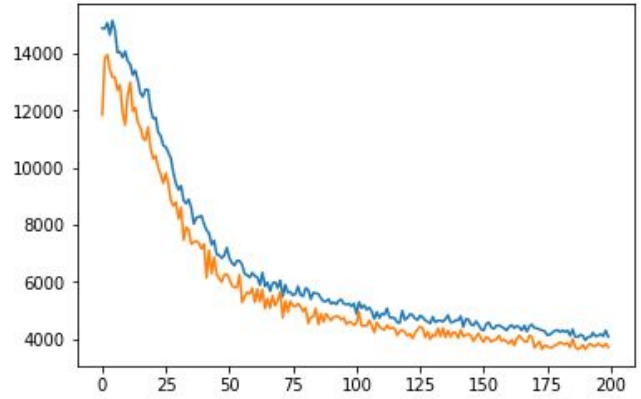
Beta=1; no beta decay

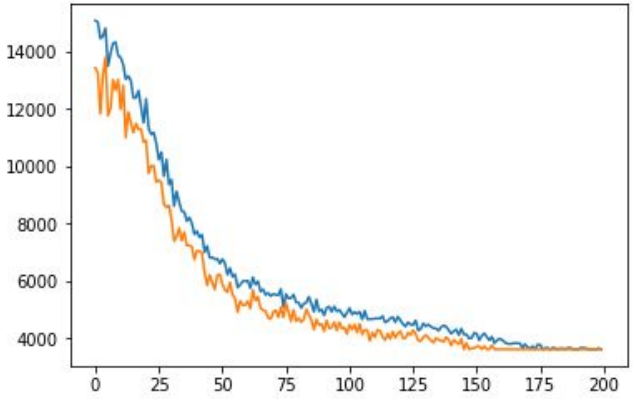


Beta=1; beta decay=.05

TSP 2





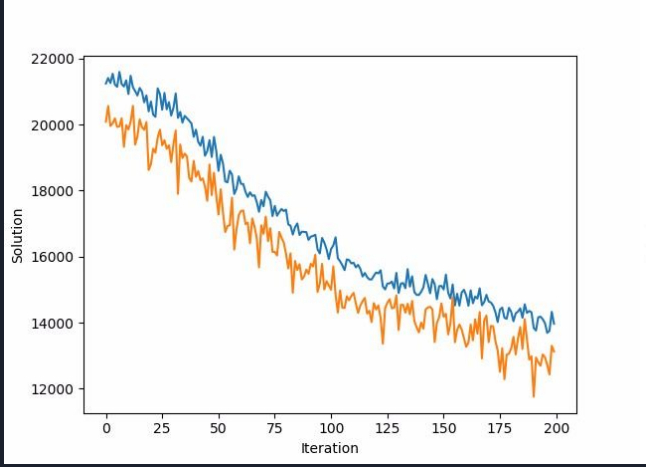


Beta=0

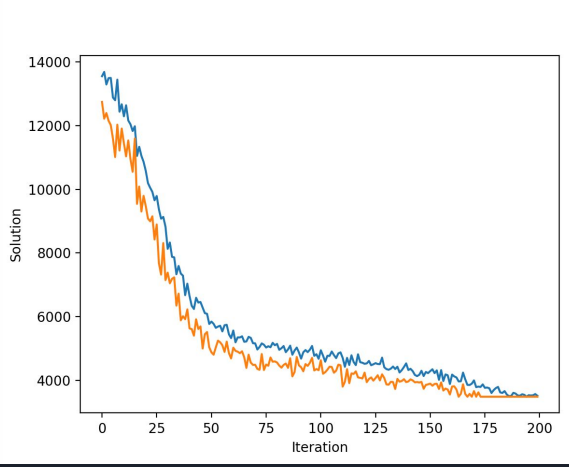
Beta=1; no beta decay

Beta=1; beta decay=.05

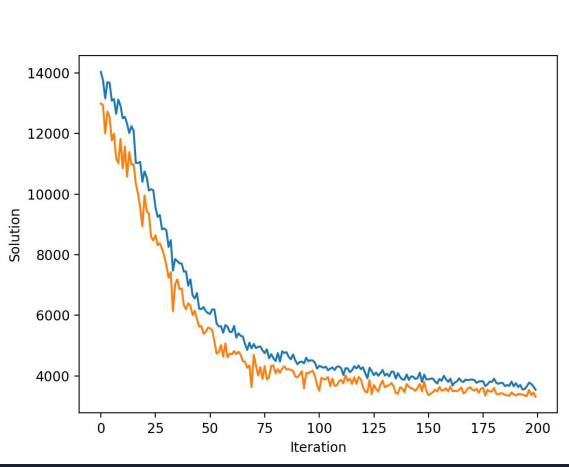
TSP 3



Beta=0



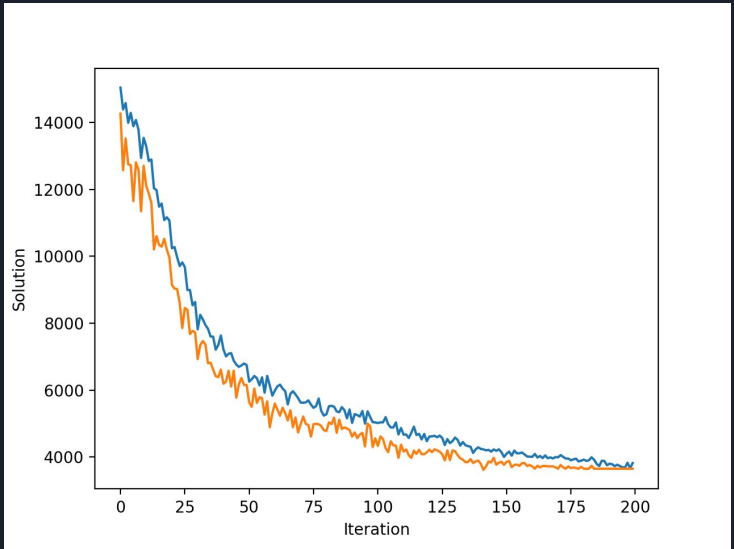
Beta=1; no beta decay



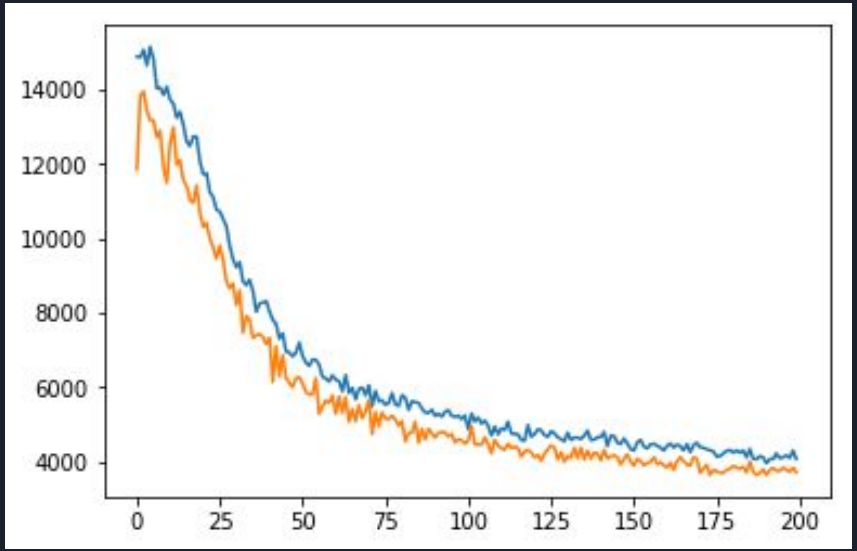
Beta=1; beta decay=.05

Beta_Decrease_Rate Comparison (TSP2)

0.10



0.05



Evaluation

- without a heuristic the learning is extremely slow, but static and still converges to a solution
- no big difference between the steady heuristic and the heuristic decrease
- no big difference between different beta-decrease-rates
- experimenting with pheromone_intensification = 1 did not make a huge difference

Thanks for your Attention!