

Top Trumps: Rules

- 1: Shuffle deck and distribute evenly among players
- 2: Starting player chooses characteristic (category)
- 3: All players compare corresponding values on their cards
- 4: Player with *highest* value wins trick
- 5: ~~Until at least one player has lost all their cards~~
- 5: Until at all cards have been played exactly once
- 6: Winning player announces new characteristic, goto 3



Alfa Romeo Giulietta (940)

| | |
|-----------------|----------|
| Cubic capacity: | 1368 ccm |
| Top speed: | 195 km/h |
| Width: | 1798 mm |
| Length: | 4351 mm |
| Height: | 1456 mm |
| CO2 emission: | 148 g/km |

Agents

- both remember all previously played cards

KA **K**nowledgable **A**gent: Knows the exact values of all cards in the deck

NA **N**aïve **A**gent: Only knows the valid value ranges

| id | name | description | range |
|----|------------|---|--------|
| 1 | deckHV | deck hypervolume maximising card values | [0,?] |
| 2 | catSD | standard deviation of category means | [0,?] |
| 3 | fair | <i>KA</i> (Knowledgable player) winrate | [0,1] |
| 4 | leadChange | average # trick changes | [0,16] |
| 5 | trickDiff | average trick difference | [0,16] |

Instances

32 cards, 4 categories \Rightarrow dimension 128

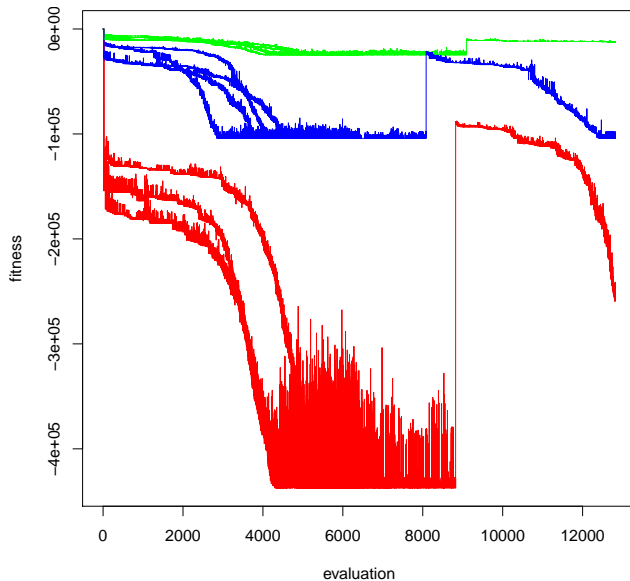
Category bounds

1 Instance 1: $[39, 84] \times [78, 80] \times [20, 91] \times [34, 77]$

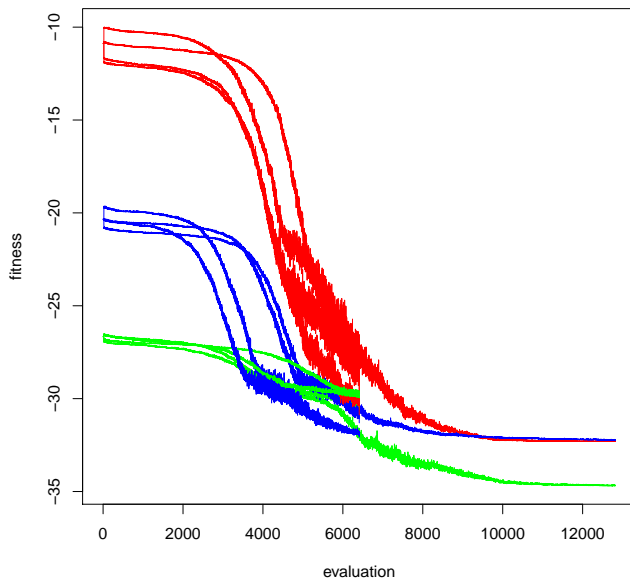
2 Instance 2: $[70, 81] \times [09, 12] \times [35, 42] \times [07, 70]$

3 Instance 3: $[22, 56] \times [39, 44] \times [14, 29] \times [56, 86]$

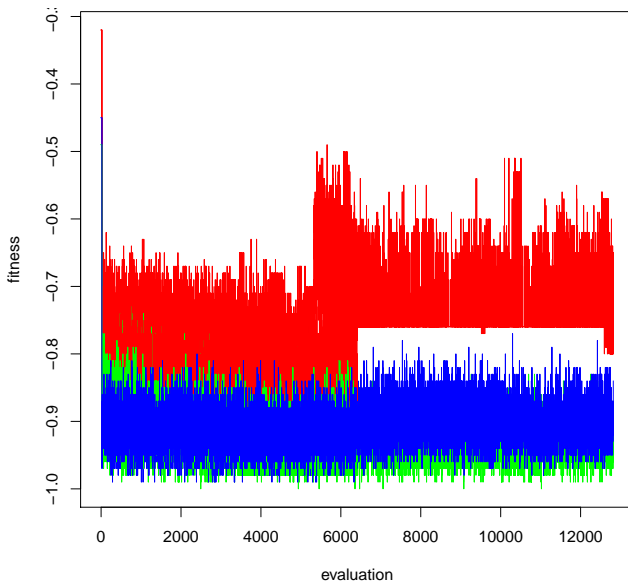
CMA-ES Performance: deckHV, dim 128, [0,?]



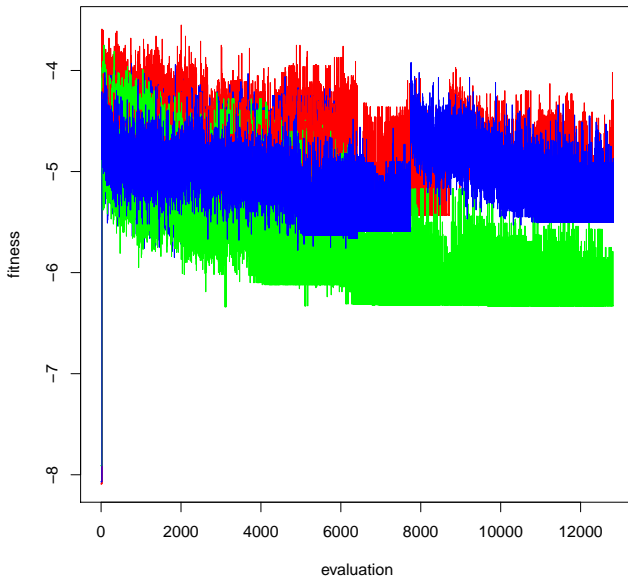
CMA-ES Performance: catSD, dim 128, [0,?]



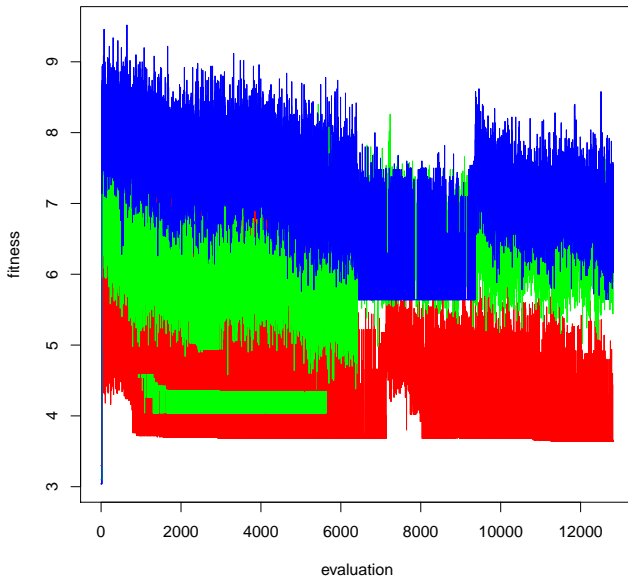
CMA-ES Performance: fair, dim 128, [0,1]



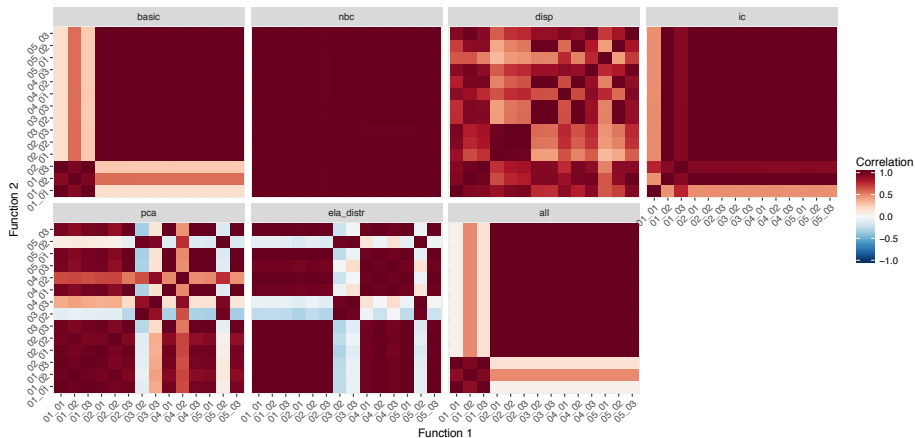
CMA-ES Performance: leadChange, dim 128, [0,16]



CMA-ES Performance: trickDiff, dim 128, [0,16]



Results: ELA on TopTrumps



SMS-EMOA Performance: deckHV vs. catSD

