

EC Competition 2019 Analysis on Results

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■ Purpose of EC competition

- To **understand** real-world problems by solving them
 - What algorithms are effective in practice?
 - How should we formulate real-world problems?

■ Knowing is worthier than winning

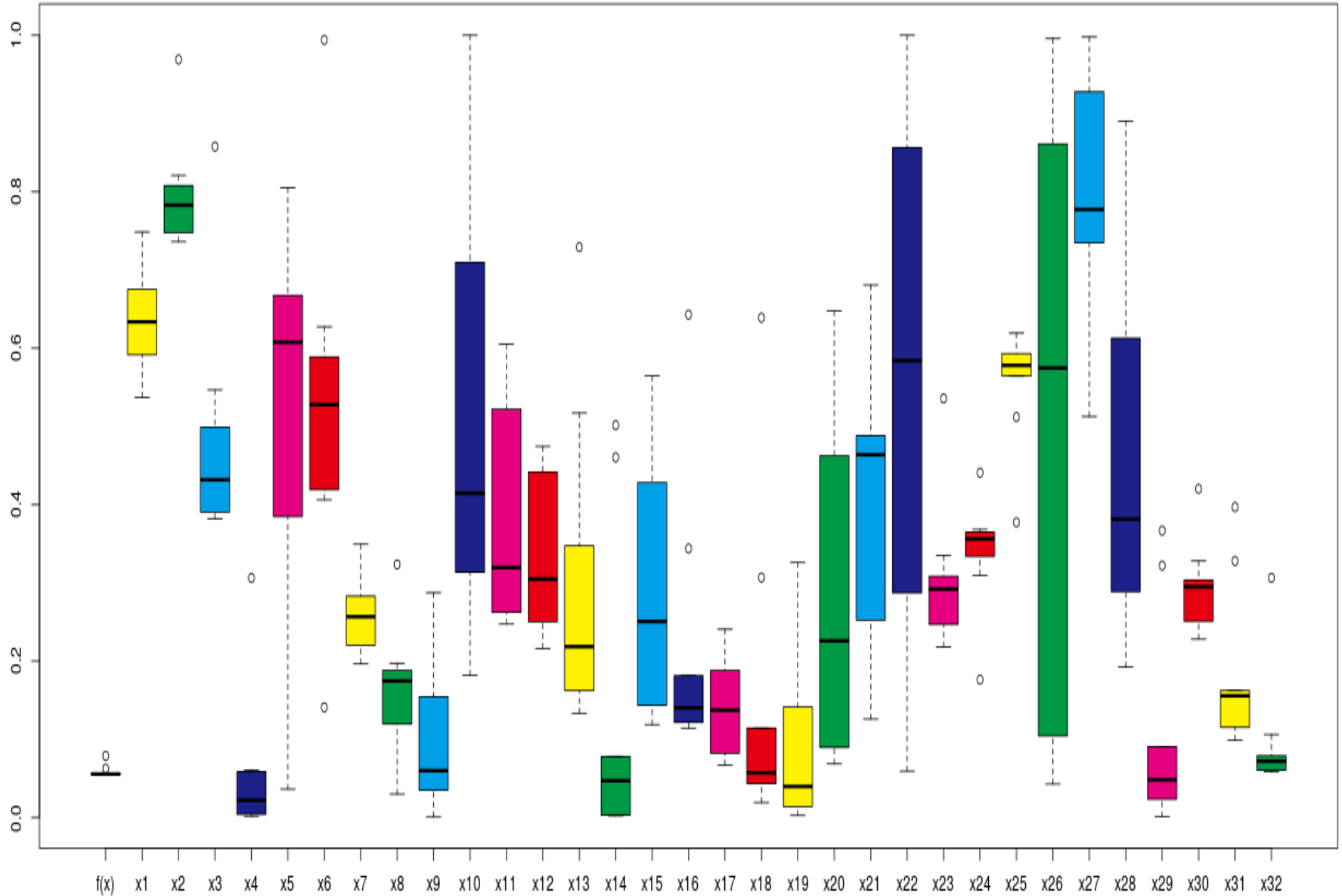
- What is the key aspect that decided the victory?
- Let's see the submitted data from each team

Single-objective

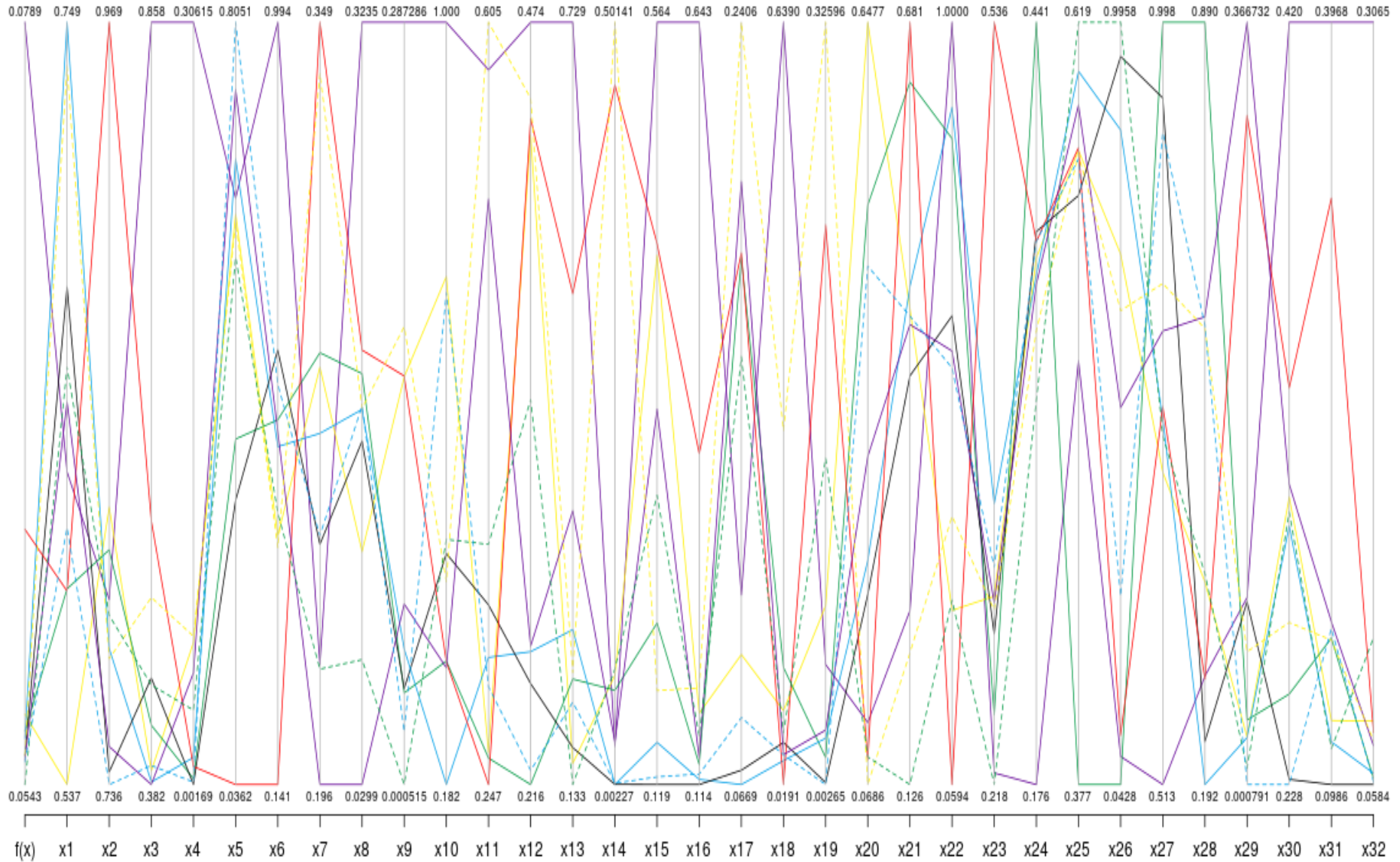
Ranking

Team	Median f(x)	Rank (Median)	Best f(x)	Rank (Best)
S01	0.078854218	7	0.062543495	7
S02	0.056596708	5	0.055134148	3
S03	0.056049541	3	0.055301076	4
S04	0.057617756	6	0.055813531	6
S05	0.056069596	4	0.055536909	5
S07	0.055819271	2	0.054334158	1
S08	0.055256613	1	0.055056593	2

Similar values but different variables



All solutions are different local optima

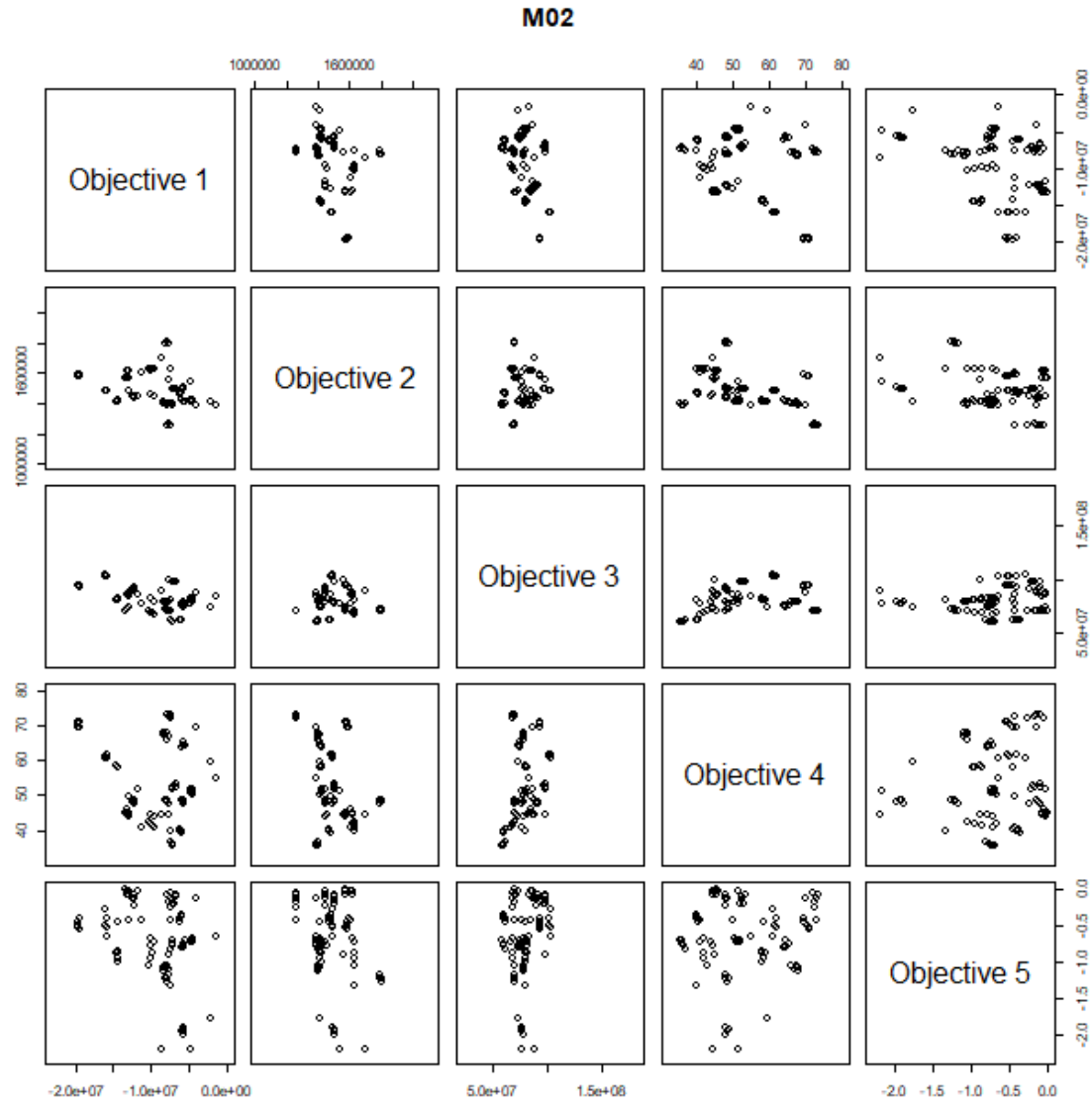


Multi-objective

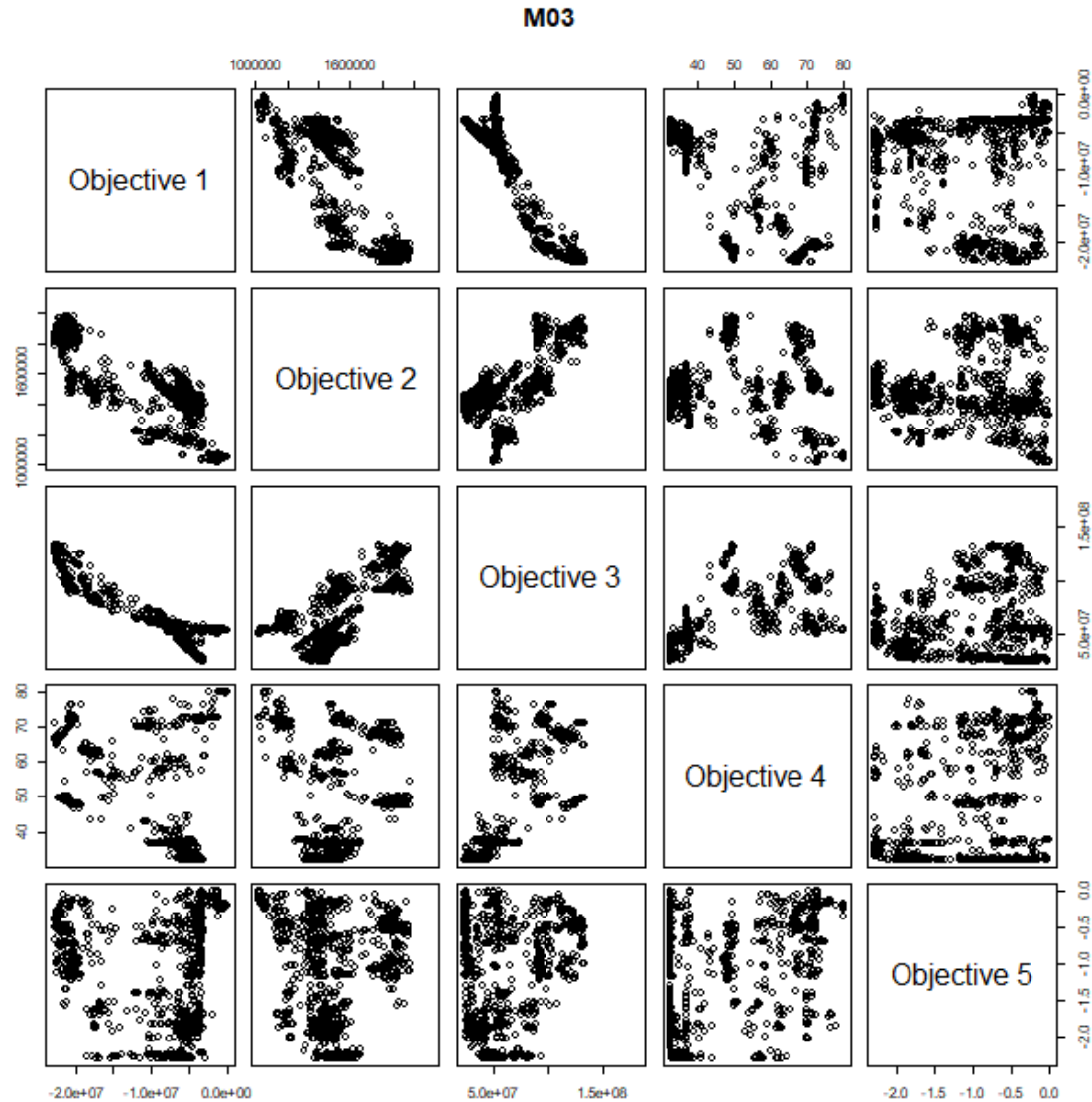
Ranking

Team	Median HV	#Nd.Pts.	Rank (Median)	Best HV	Rank (Best)
M02	2.963295	617	5	3.302039	5
M03	4.927480	1503	4	5.085406	4
M04	5.137813	1994	3	5.252494	1
M05	5.138977	1092	2	5.190210	3
M07	5.162676	1399	1	5.241505	2

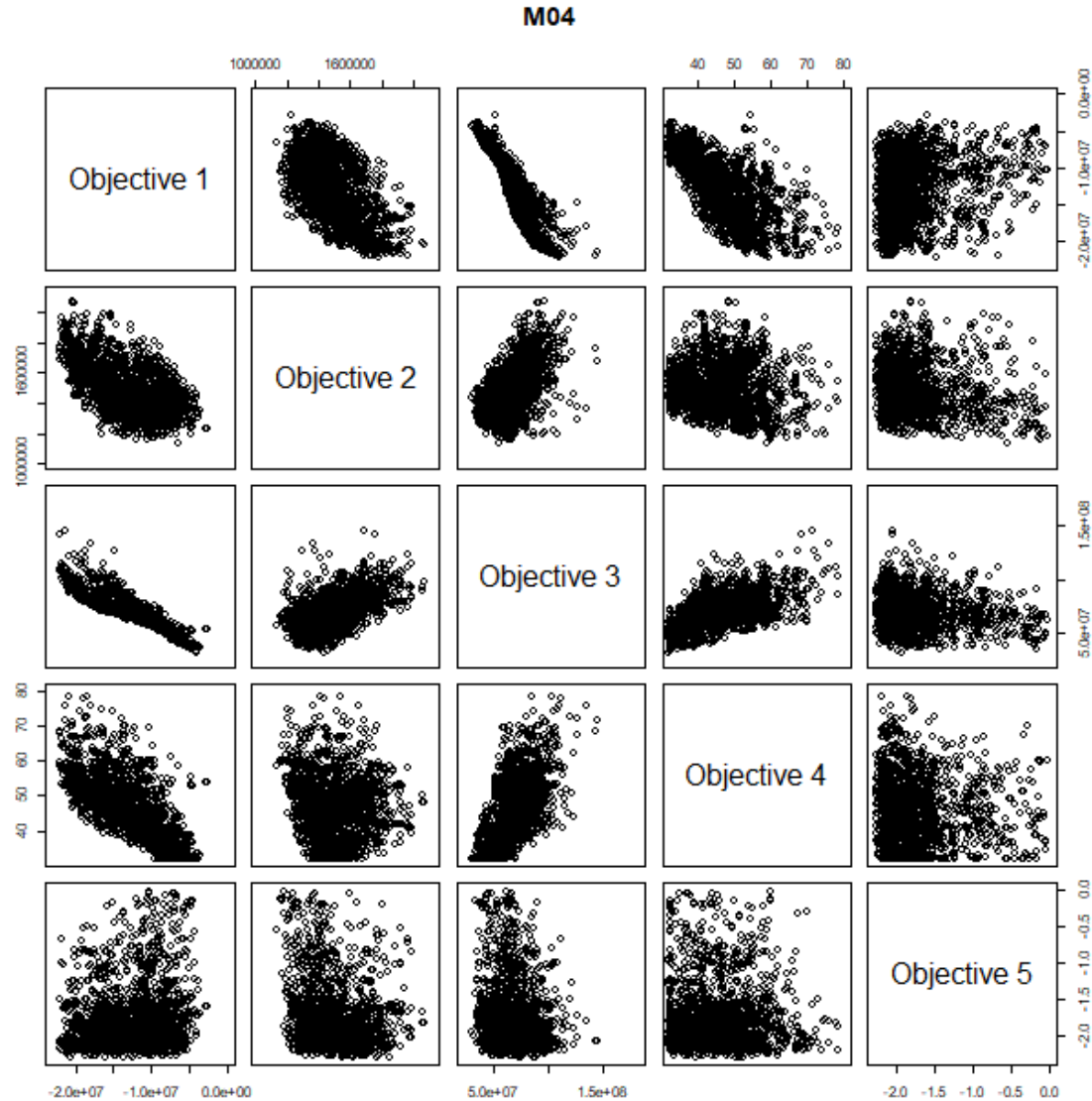
M02: N=617



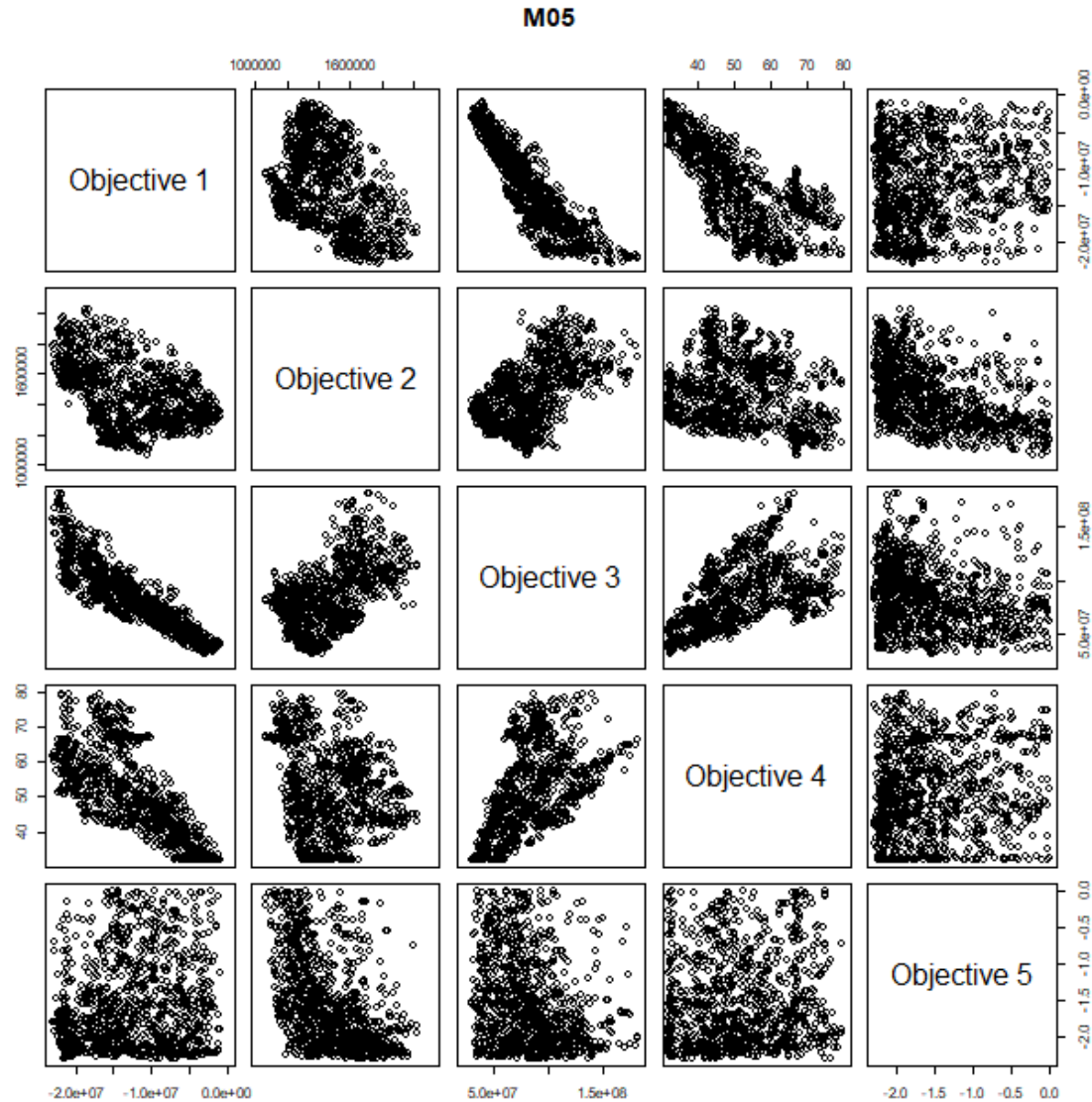
M03: N=1503

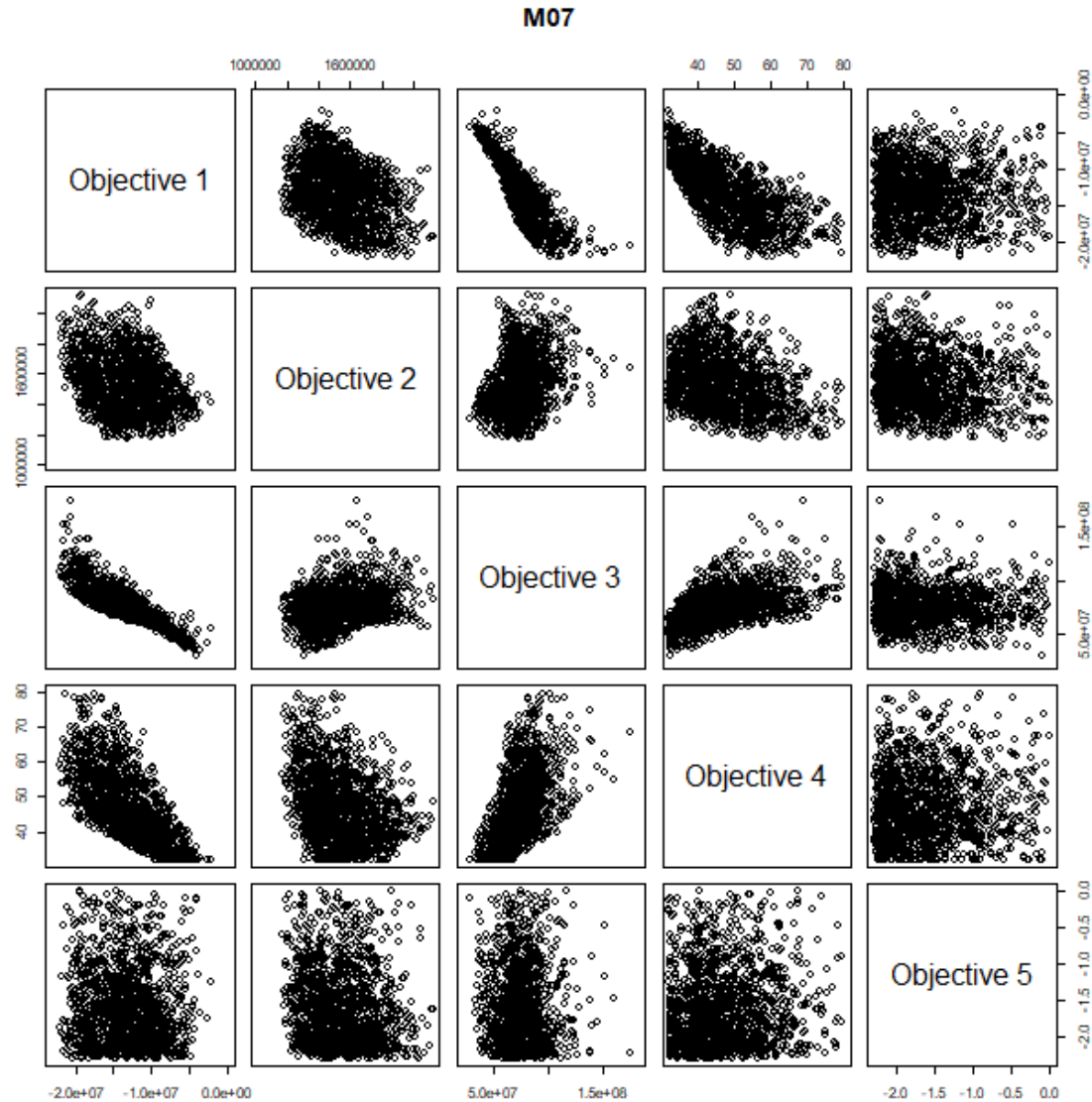


M04: N=1994

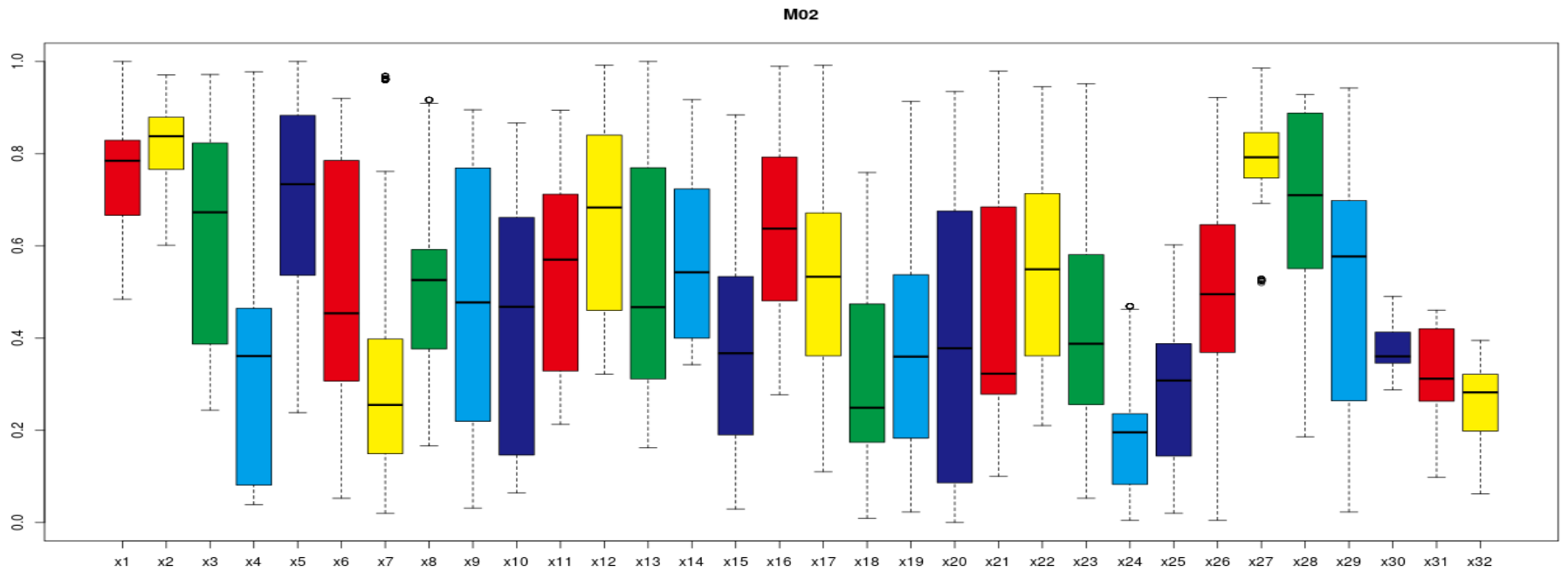
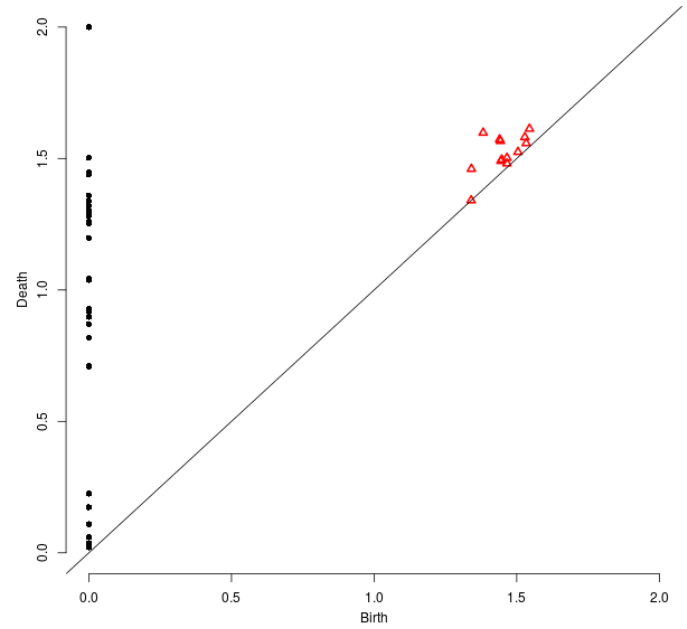


M05: N=1092

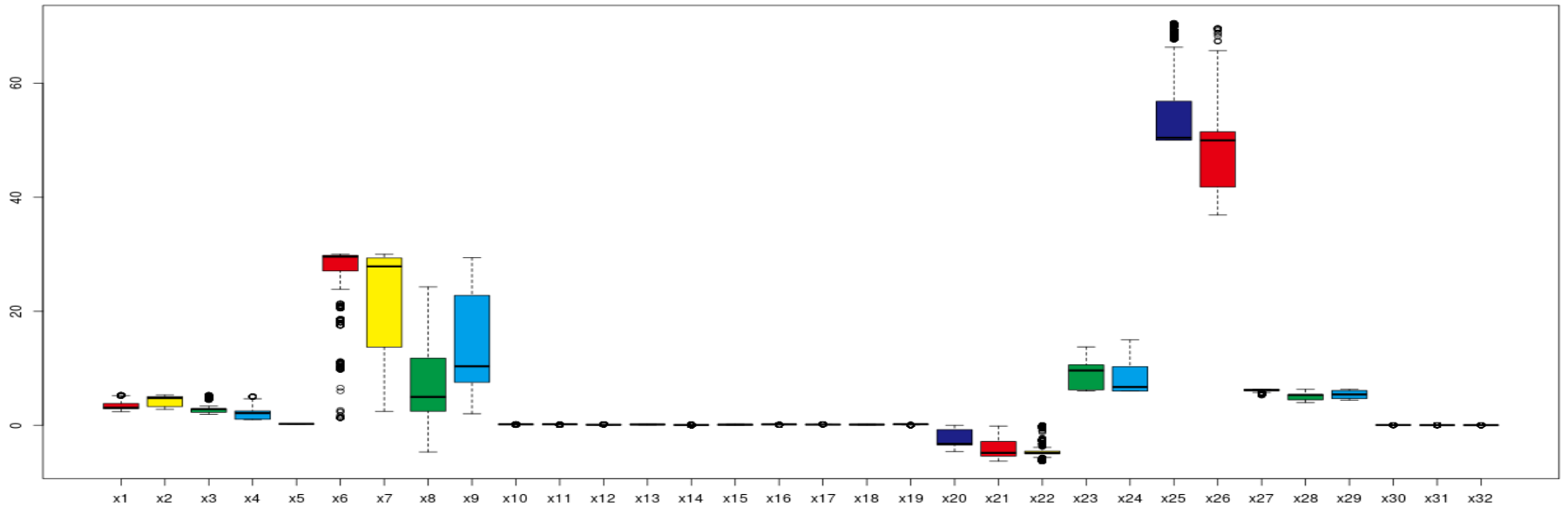
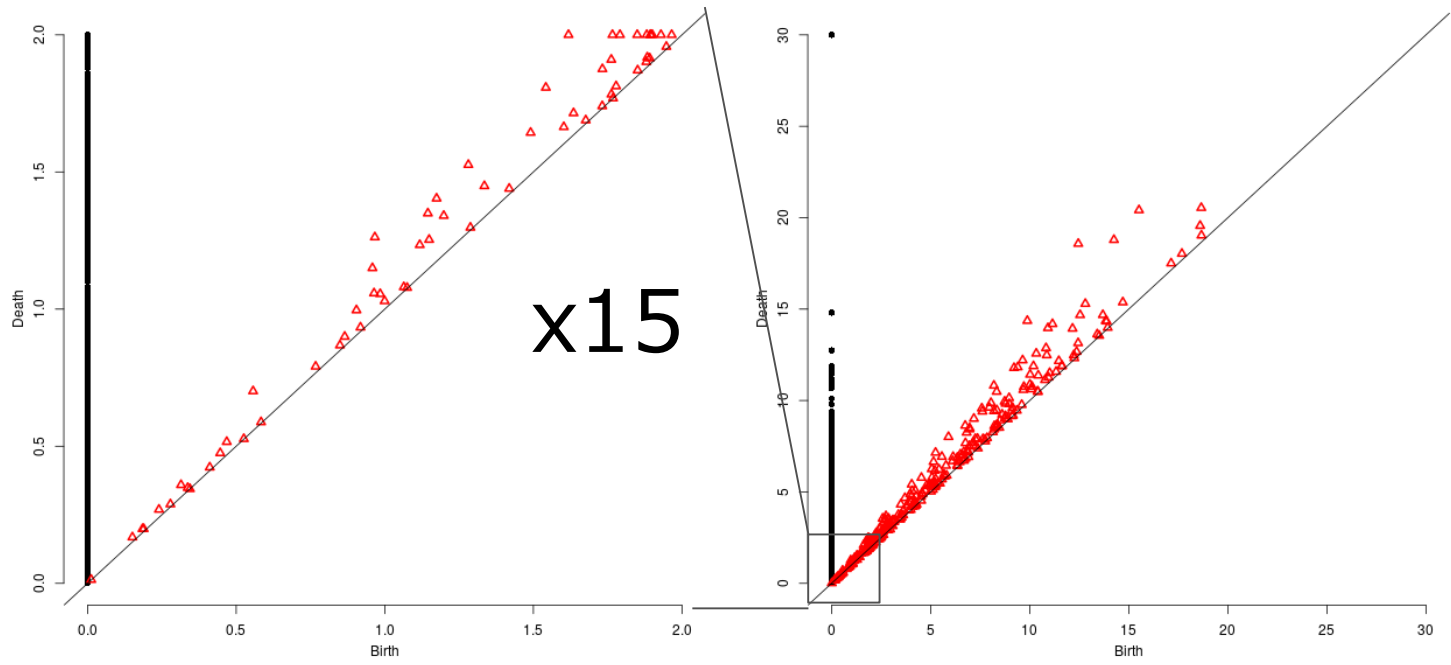




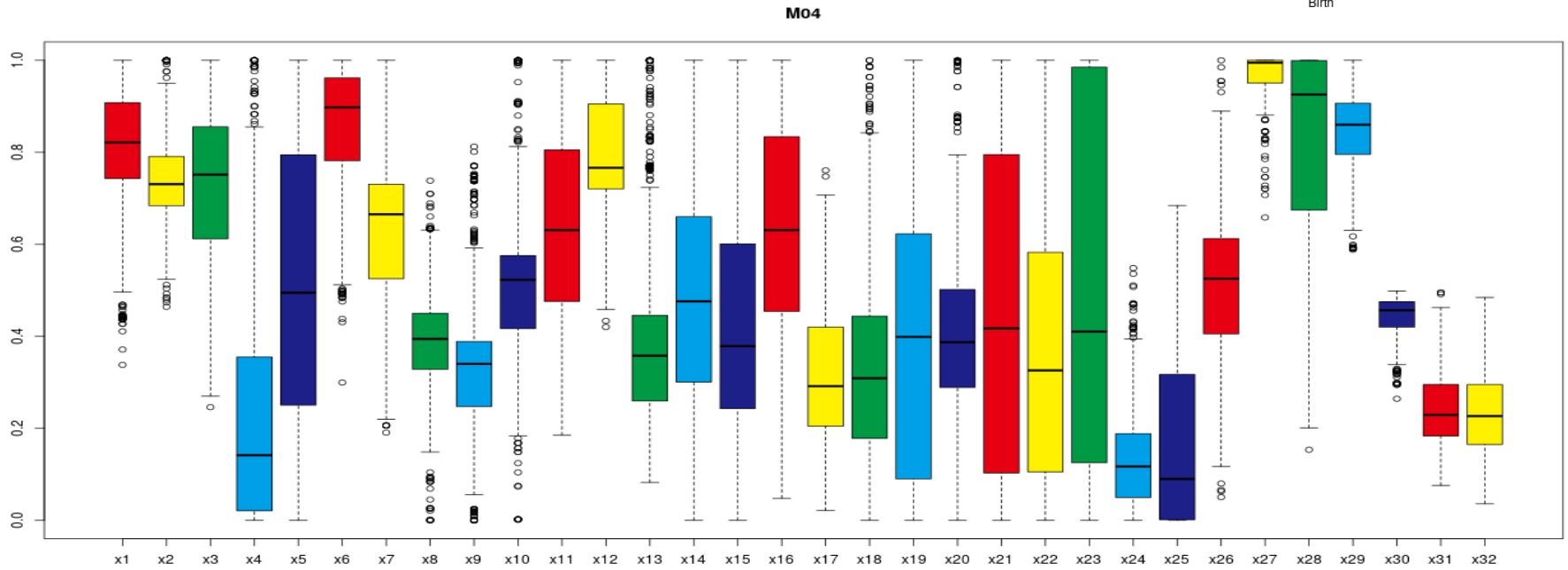
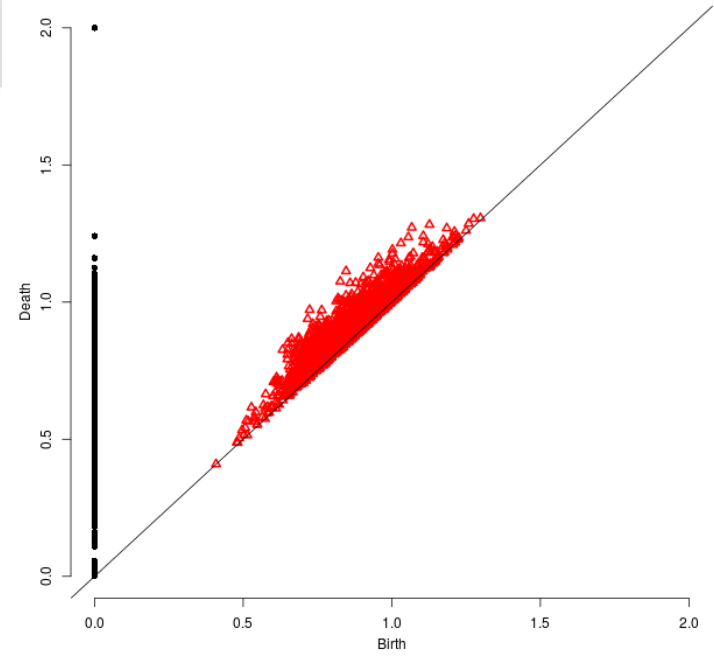
M02



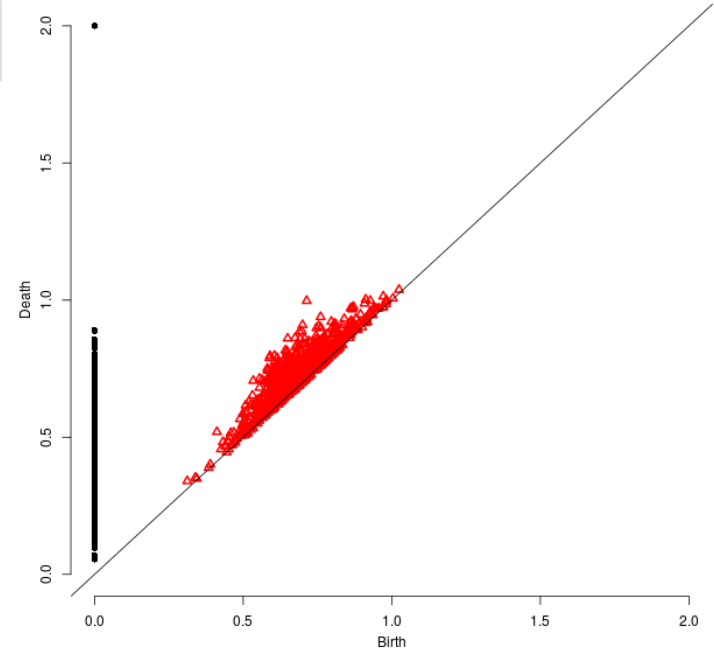
M03



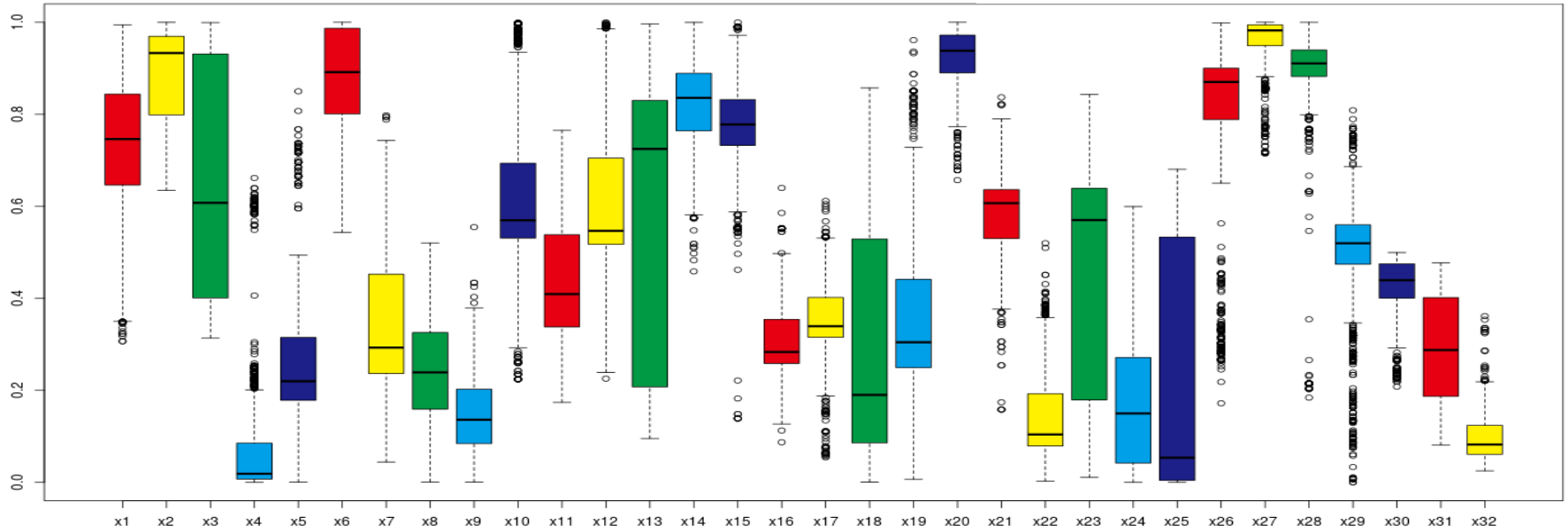
M04



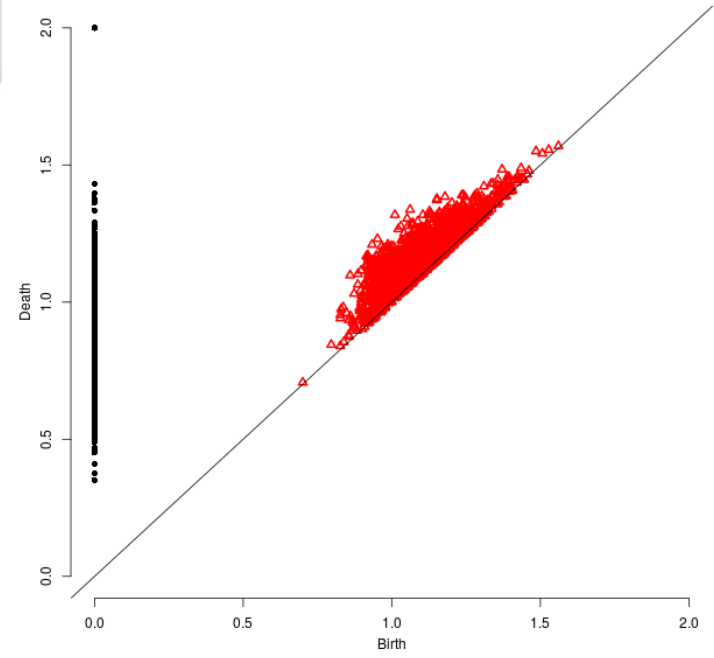
M05



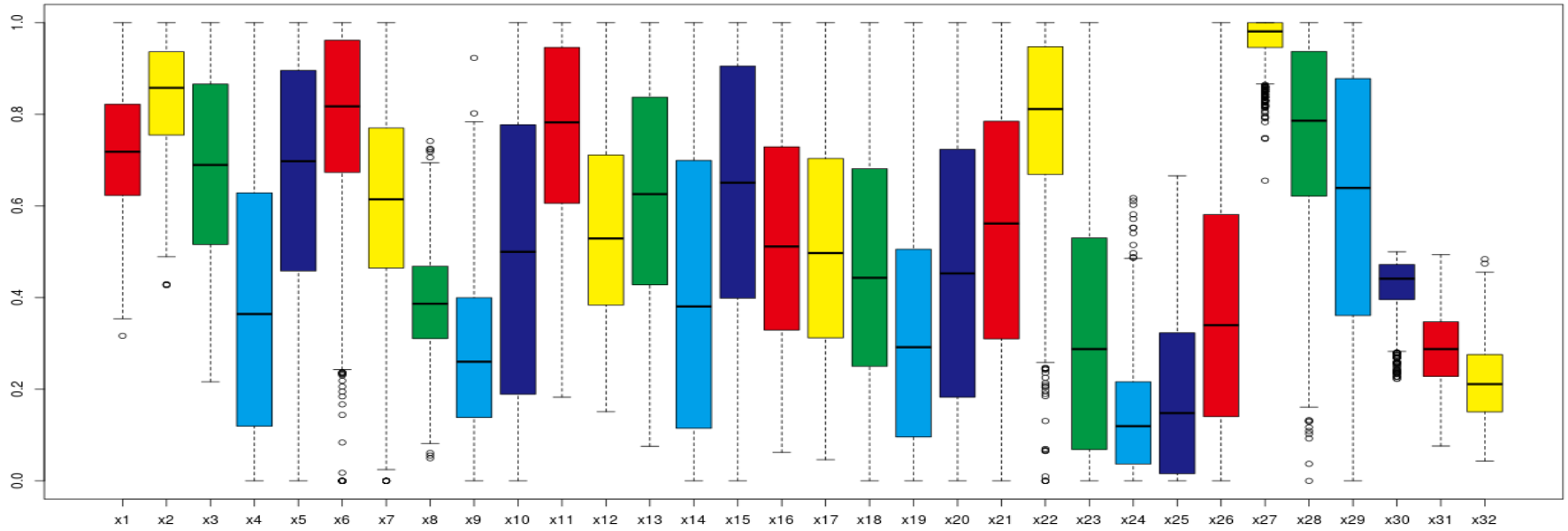
M05



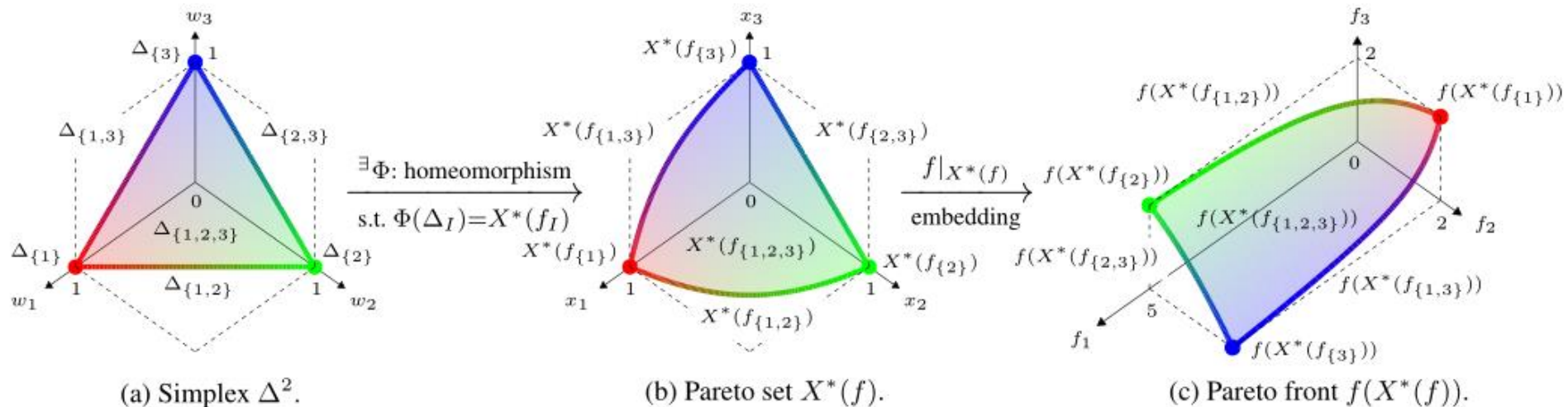
M07




M07



- The problem may have a single funnel
 - All non-dominated fronts have one cluster
 - Diversity enhancement is needed but niching is not
- Diversity in decision space is also important
 - The winner maintained diversity in all coordinates
 - The other teams lost diversity in some coordinates
- The problem may be simplicial





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shaping tomorrow with you