Resolution and accuracy in Congreve & Lamsdell matrices

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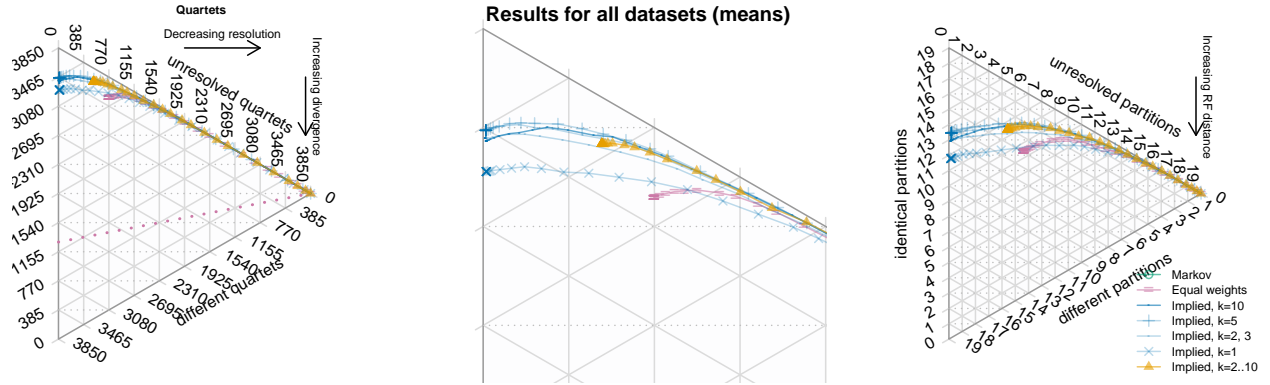
2019-06-20

Contents
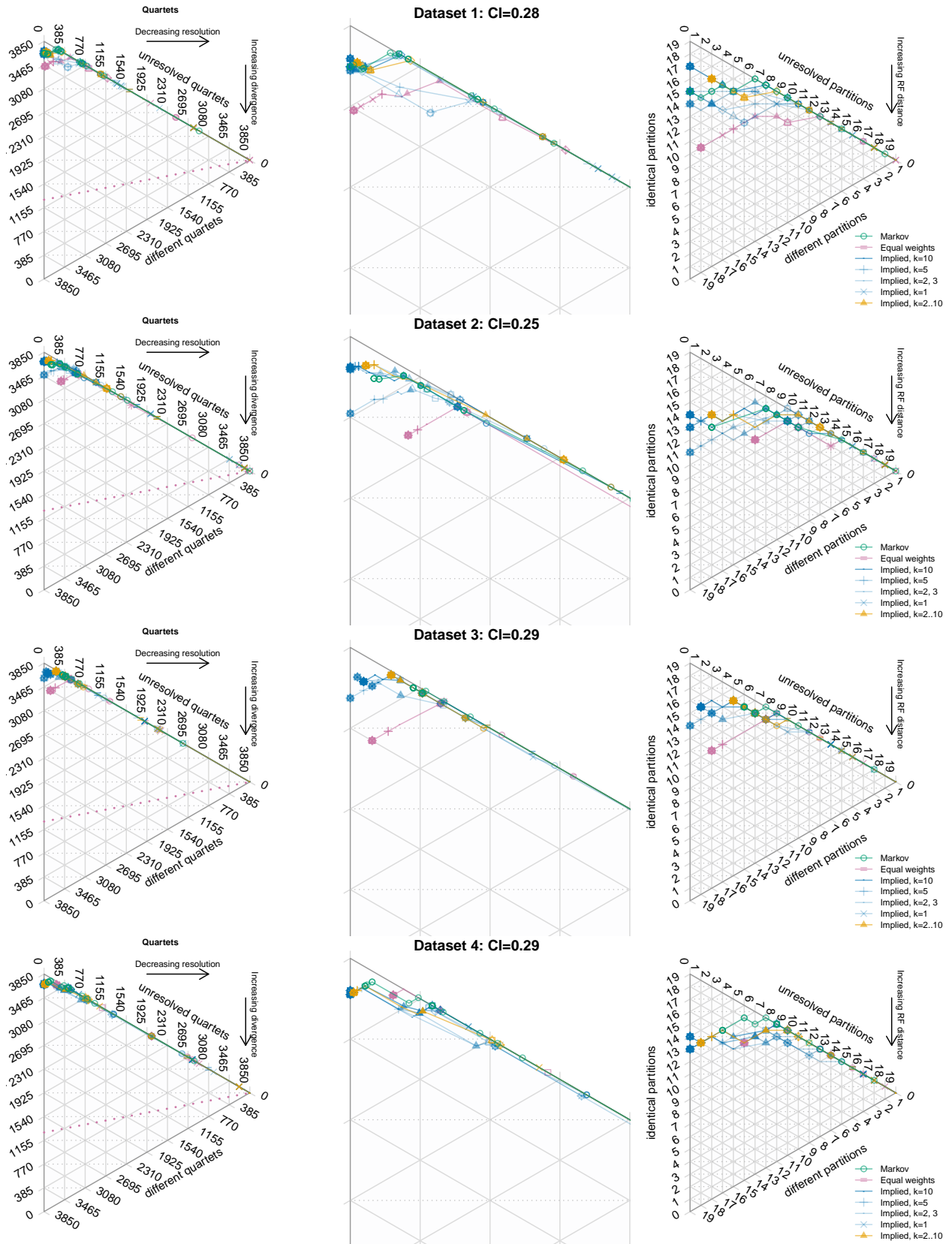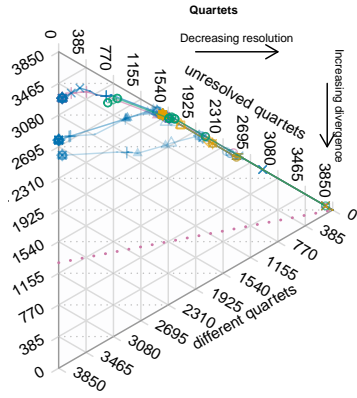
This page depicts the analytical results of all 100 matrices generated by Congreve & Lamsdell [1] using a ternary plotting approach [2], with quartets and partitions used as distance metrics.
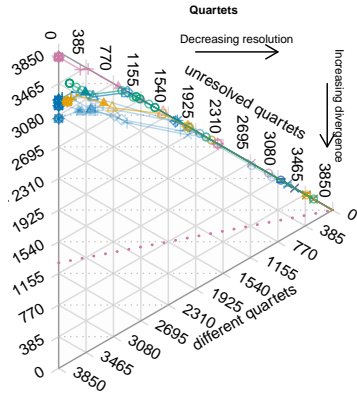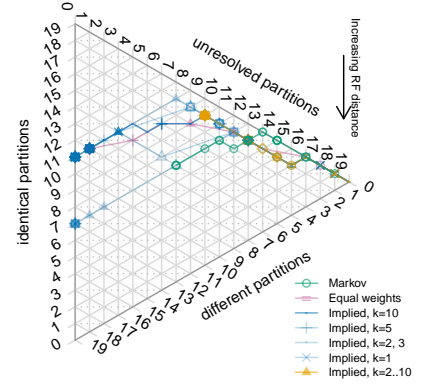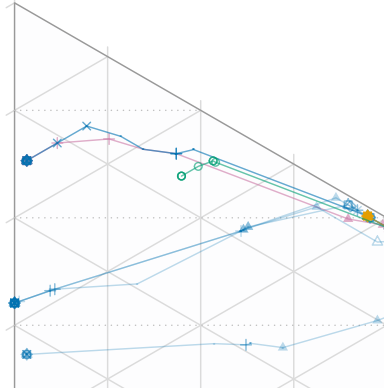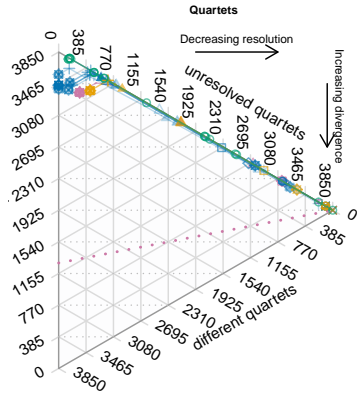
0.1 Summary

0.2 Trees 1–10

Quartets

Decreasing resolution →

Increasing divergence ↓

unresolved quartets

different quartets

Dataset 1: CI=0.28

Increasing RF distance

unresolved partitions

different partitions

identical partitions

- ◯ Markov
- □ Equal weights
- ╋ Implied, k=10
- ╋ Implied, k=5
- Implied, k=2, 3
- ✕ Implied, k=1
- ▲ Implied, k=2..10

Quartets

Decreasing resolution →

Increasing divergence ↓

unresolved quartets

different quartets

Dataset 2: CI=0.25

Increasing RF distance

unresolved partitions

different partitions

identical partitions

- ◯ Markov
- □ Equal weights
- ╋ Implied, k=10
- ╋ Implied, k=5
- Implied, k=2, 3
- ✕ Implied, k=1
- ▲ Implied, k=2..10

Quartets

Decreasing resolution →

Increasing divergence ↓

unresolved quartets

different quartets

Dataset 3: CI=0.29

Increasing RF distance

unresolved partitions

different partitions

identical partitions

- ◯ Markov
- □ Equal weights
- ╋ Implied, k=10
- ╋ Implied, k=5
- Implied, k=2, 3
- ✕ Implied, k=1
- ▲ Implied, k=2..10

Quartets

Decreasing resolution →

Increasing divergence ↓

unresolved quartets

different quartets

Dataset 4: CI=0.29

Increasing RF distance

unresolved partitions

different partitions

identical partitions

- ◯ Markov
- □ Equal weights
- ╋ Implied, k=10
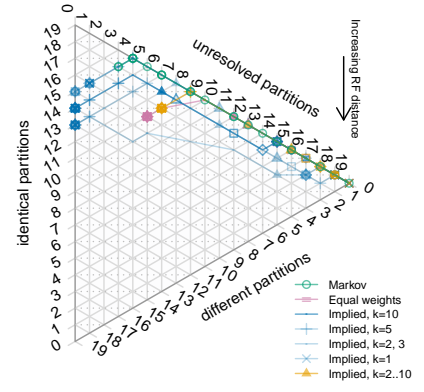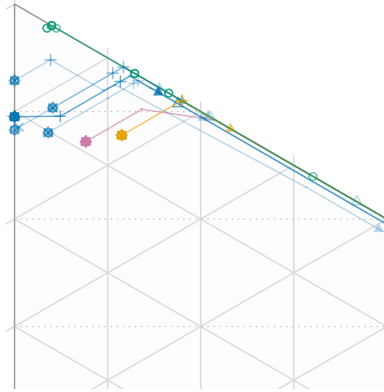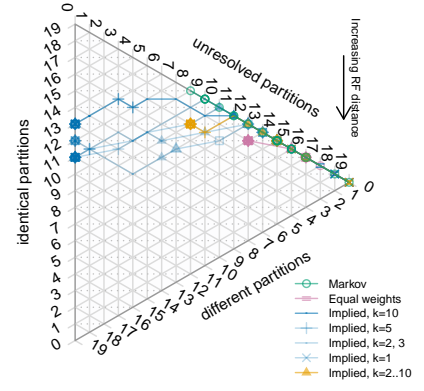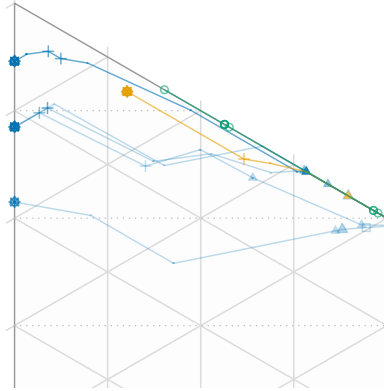- ╋ Implied, k=5
- Implied, k=2, 3
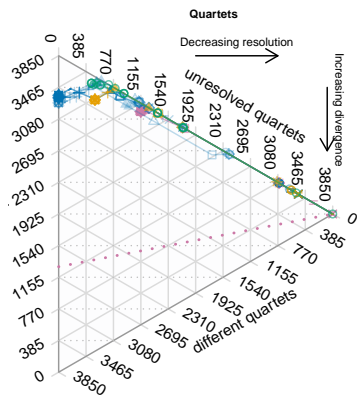- ✕ Implied, k=1
- ▲ Implied, k=2..10
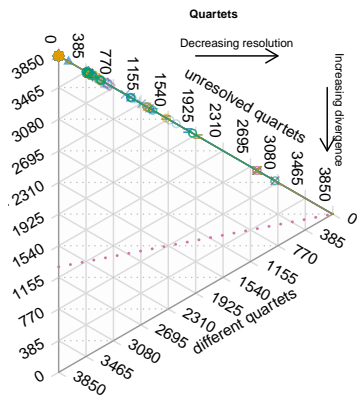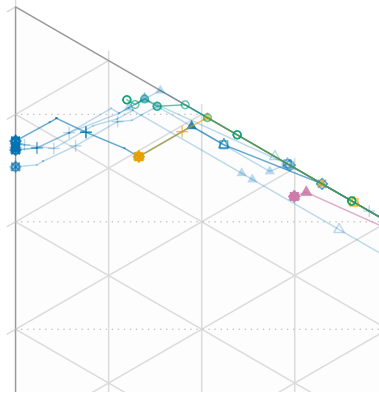
Dataset 5: CI=0.26

Dataset 6: CI=0.26

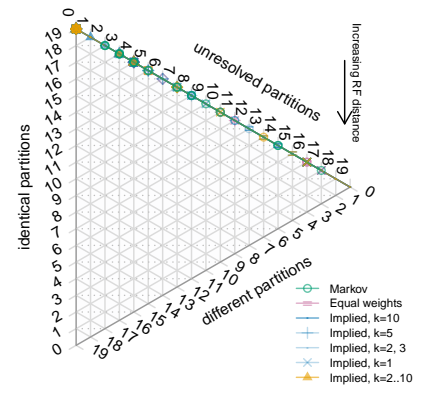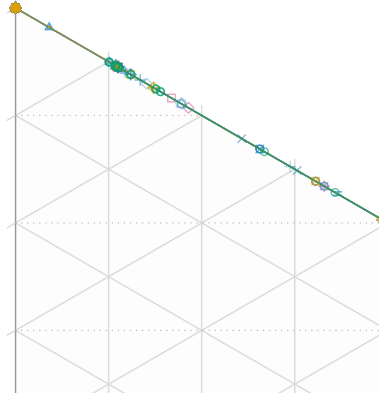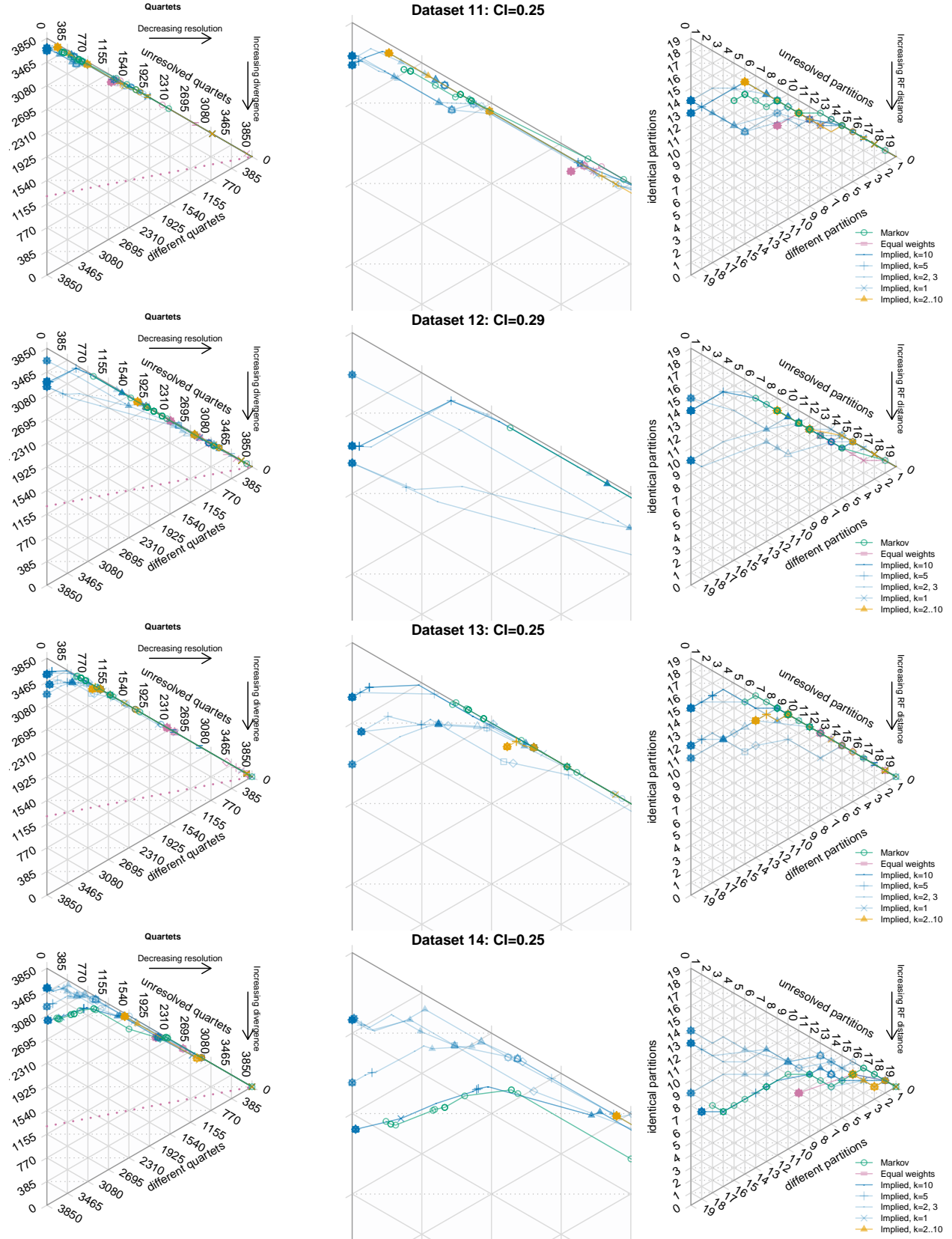**Dataset 7: CI=0.27**

Dataset 8: CI=0.25
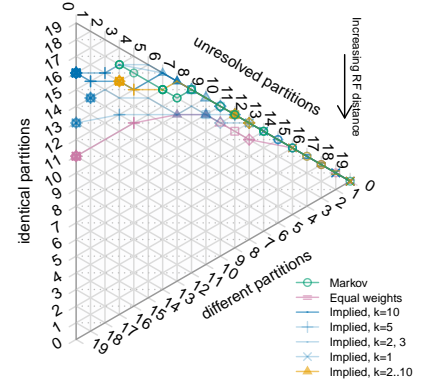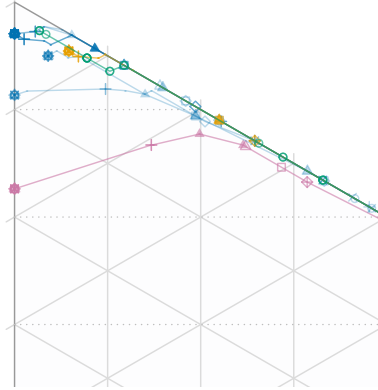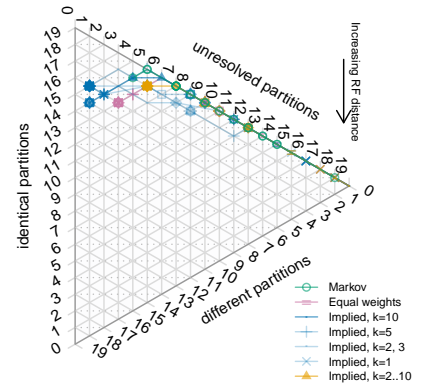
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Quartets

Decreasing resolution →

Increasing divergence

unresolved quartets

different quartets

Dataset 9: CI=0.24

Increasing RF distance →

unresolved partitions

identical partitions

different partitions

- ○ Markov
- — Equal weights
- — Implied, k=10
- + Implied, k=5
- — Implied, k=2, 3
- ✕ Implied, k=1
- ▲ Implied, k=2..10

Quartets

Decreasing resolution →

Increasing divergence

unresolved quartets

different quartets

Dataset 10: CI=0.29

Increasing RF distance →

unresolved partitions

identical partitions

different partitions

- ○ Markov
- — Equal weights
- — Implied, k=10
- + Implied, k=5
- — Implied, k=2, 3
- ✕ Implied, k=1
- ▲ Implied, k=2..10

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0.3   Trees 11–20

Dataset 11: CI=0.25

Dataset 12: CI=0.29

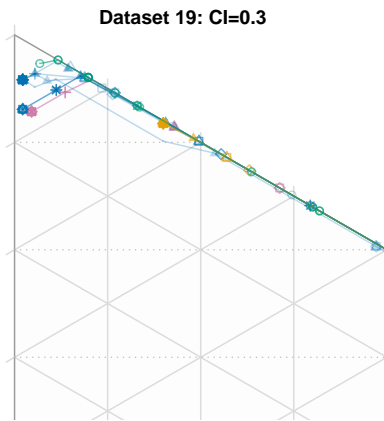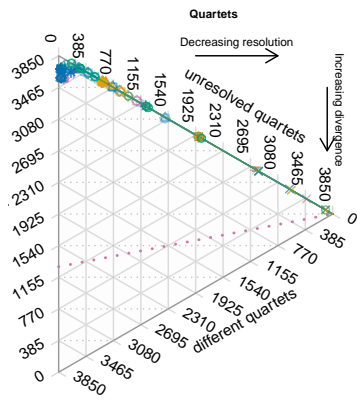**Dataset 13: CI=0.25**

Dataset 14: CI=0.25

Dataset 15: CI=0.25

Dataset 16: CI=0.25

Dataset 17: CI=0.27

Dataset 18: CI=0.28

Quartets

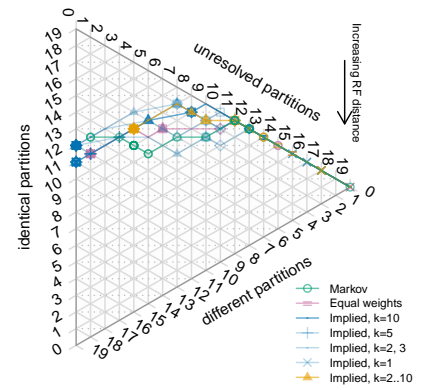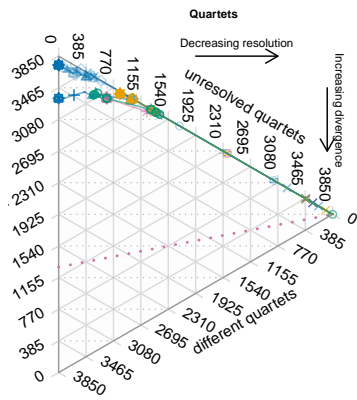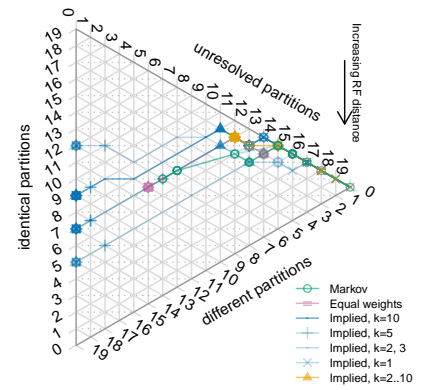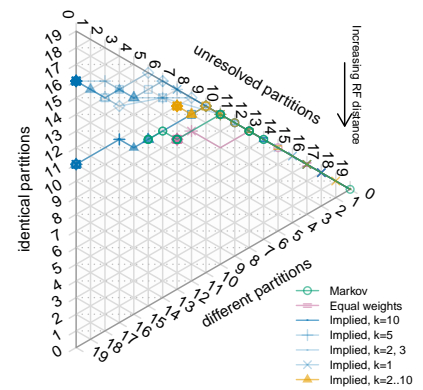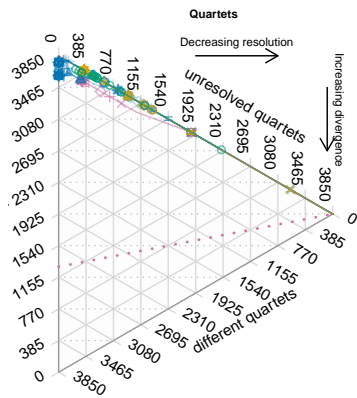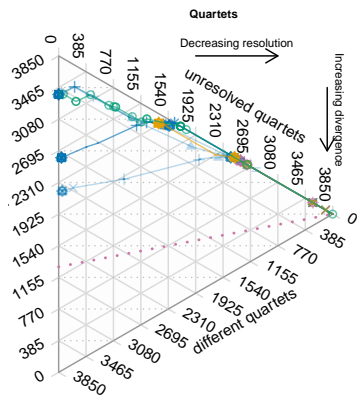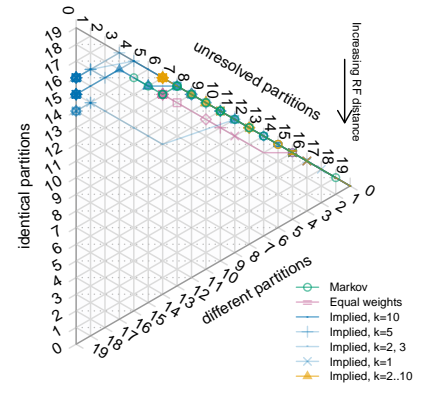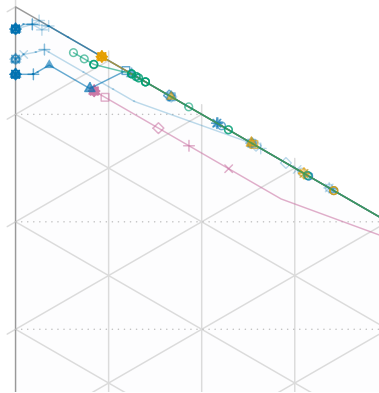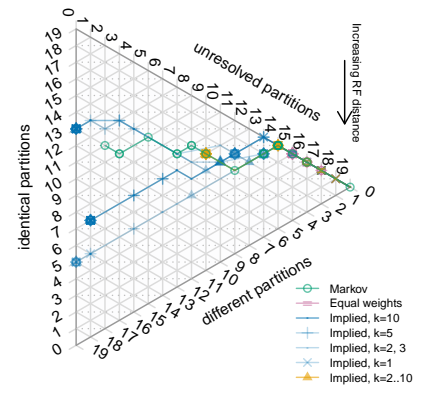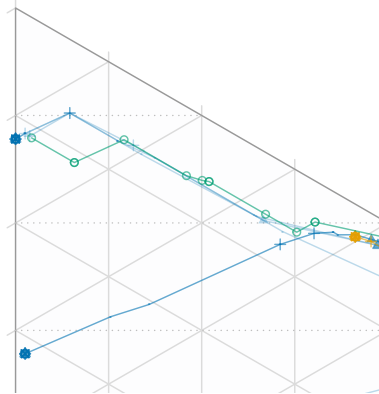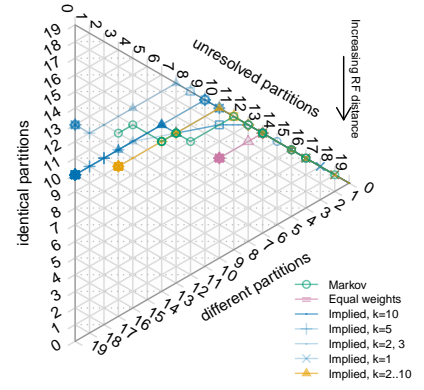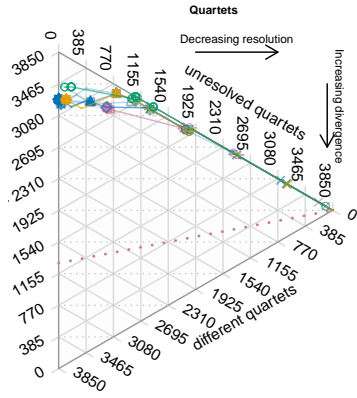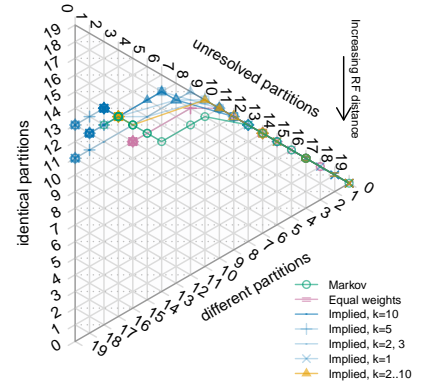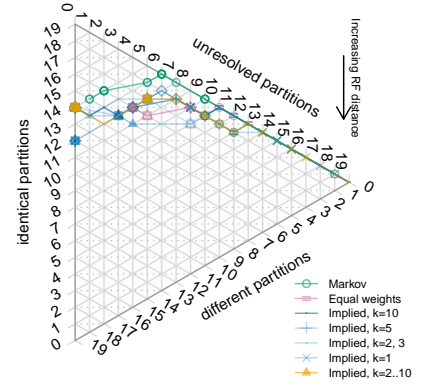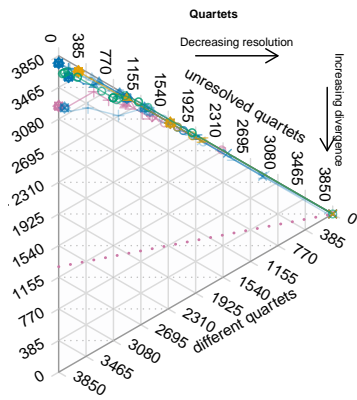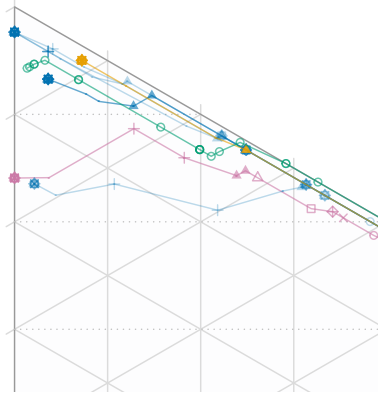Decreasing resolution →

Increasing divergence

unresolved quartets

different quartets

Dataset 19: CI=0.3

Increasing RF distance

unresolved partitions

identical partitions

different partitions

Markov
Equal weights
Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

Quartets

Decreasing resolution →

Increasing divergence

unresolved quartets

different quartets

Dataset 20: CI=0.25

Increasing RF distance

unresolved partitions

identical partitions

different partitions

Markov
Equal weights
Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

0.4   Trees 21–30

Dataset 21: CI=0.26

Dataset 22: CI=0.26

Dataset 23: CI=0.25

Dataset 24: CI=0.23

Legend (repeated in panels):
- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

Dataset 25: CI=0.28
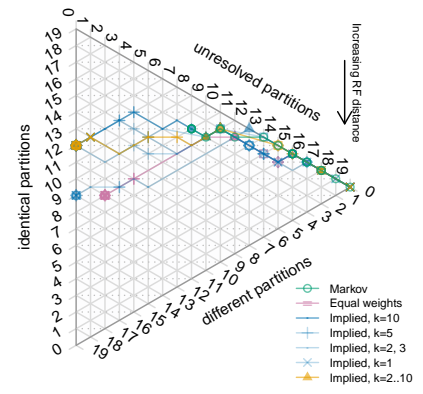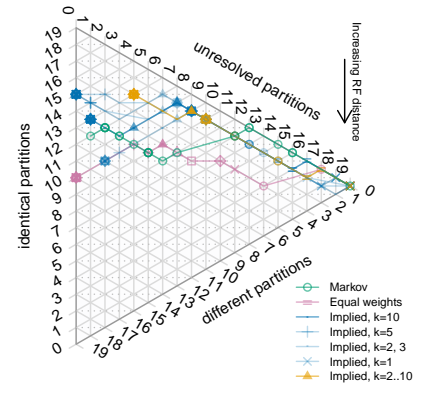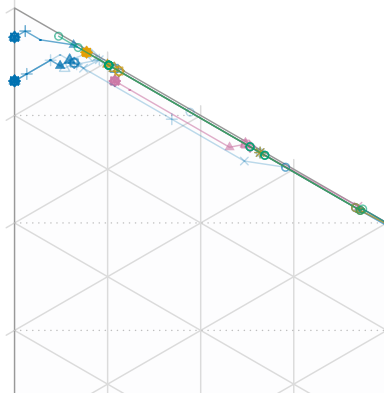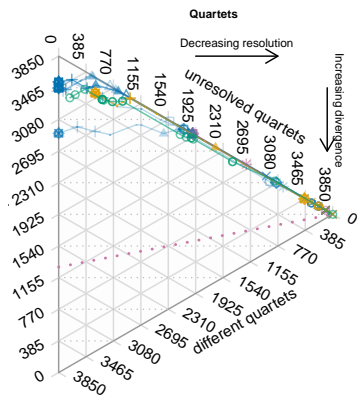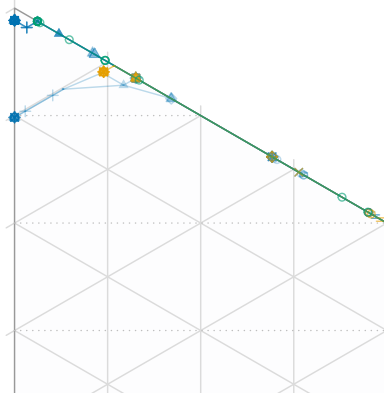
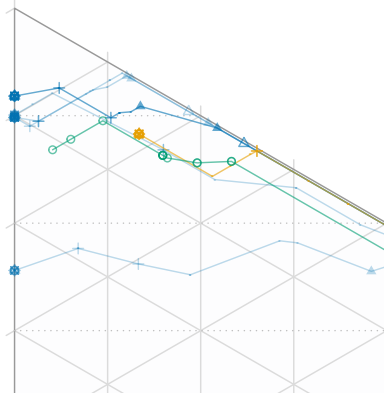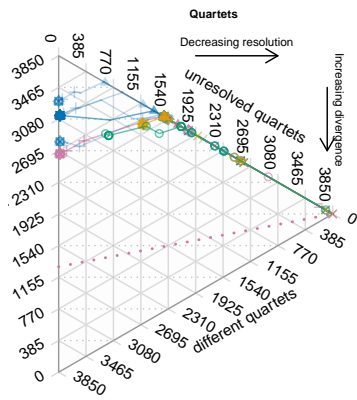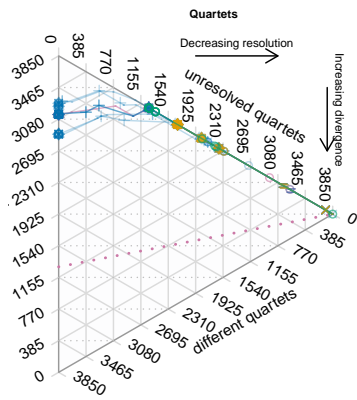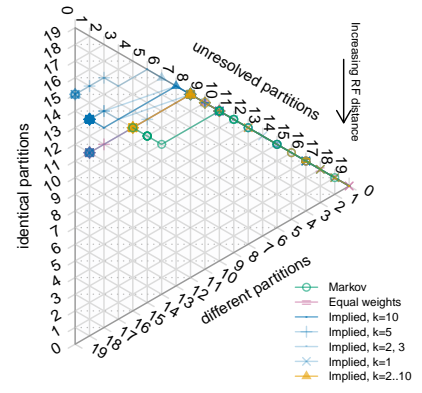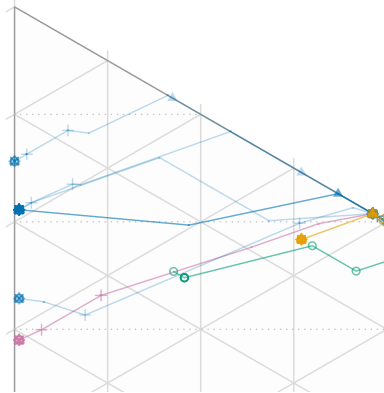Dataset 26: CI=0.27

Dataset 27: CI=0.26

Dataset 28: CI=0.27

Quartets

Decreasing resolution →

Increasing divergence

unresolved quartets

different quartets

Dataset 29: CI=0.29

Increasing RF distance

unresolved partitions

identical partitions

different partitions

- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

Quartets

Decreasing resolution →

Increasing divergence

unresolved quartets

different quartets

Dataset 30: CI=0.25

Increasing RF distance

unresolved partitions

identical partitions

different partitions

- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

0.5 Trees 31–40

Dataset 31: CI=0.26

Dataset 32: CI=0.25

Dataset 33: CI=0.27

Dataset 34: CI=0.29

Legend (repeated for each row):
- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

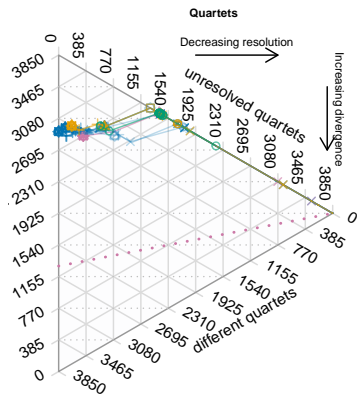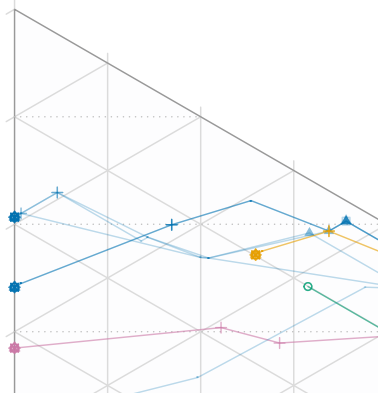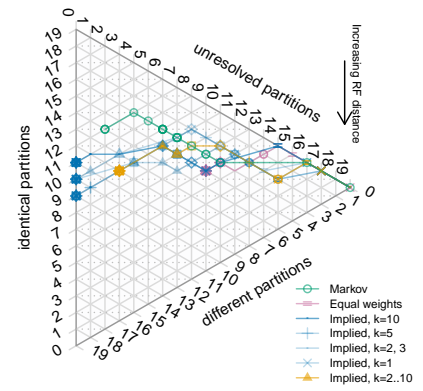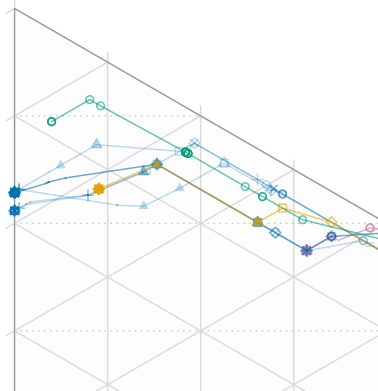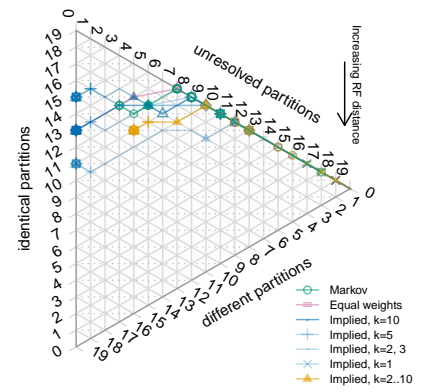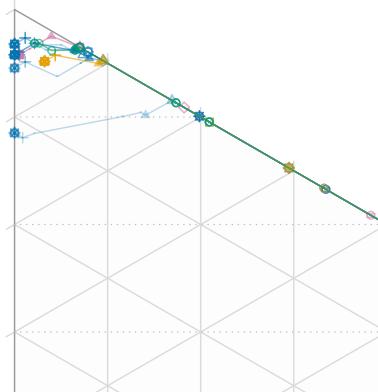Dataset 35: CI=0.25

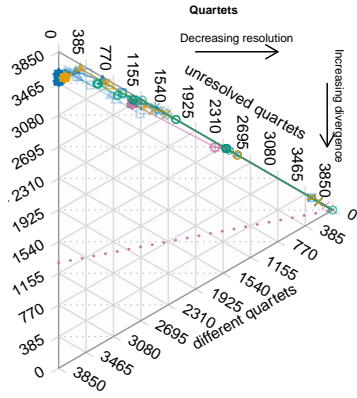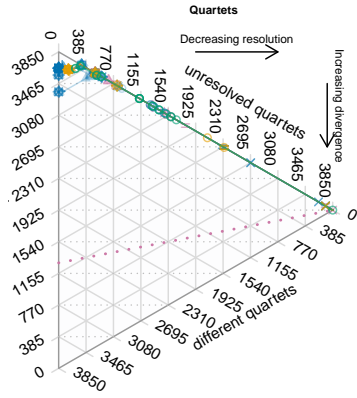Dataset 36: CI=0.24

Dataset 37: CI=0.26

Dataset 38: CI=0.29

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Quartets

Dataset 39: CI=0.25

Dataset 40: CI=0.24

Legend:
- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

0.6   Trees 41–50

Dataset 41: CI=0.3

Dataset 42: CI=0.24

Dataset 43: CI=0.27
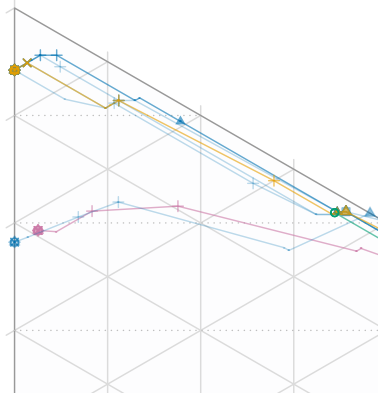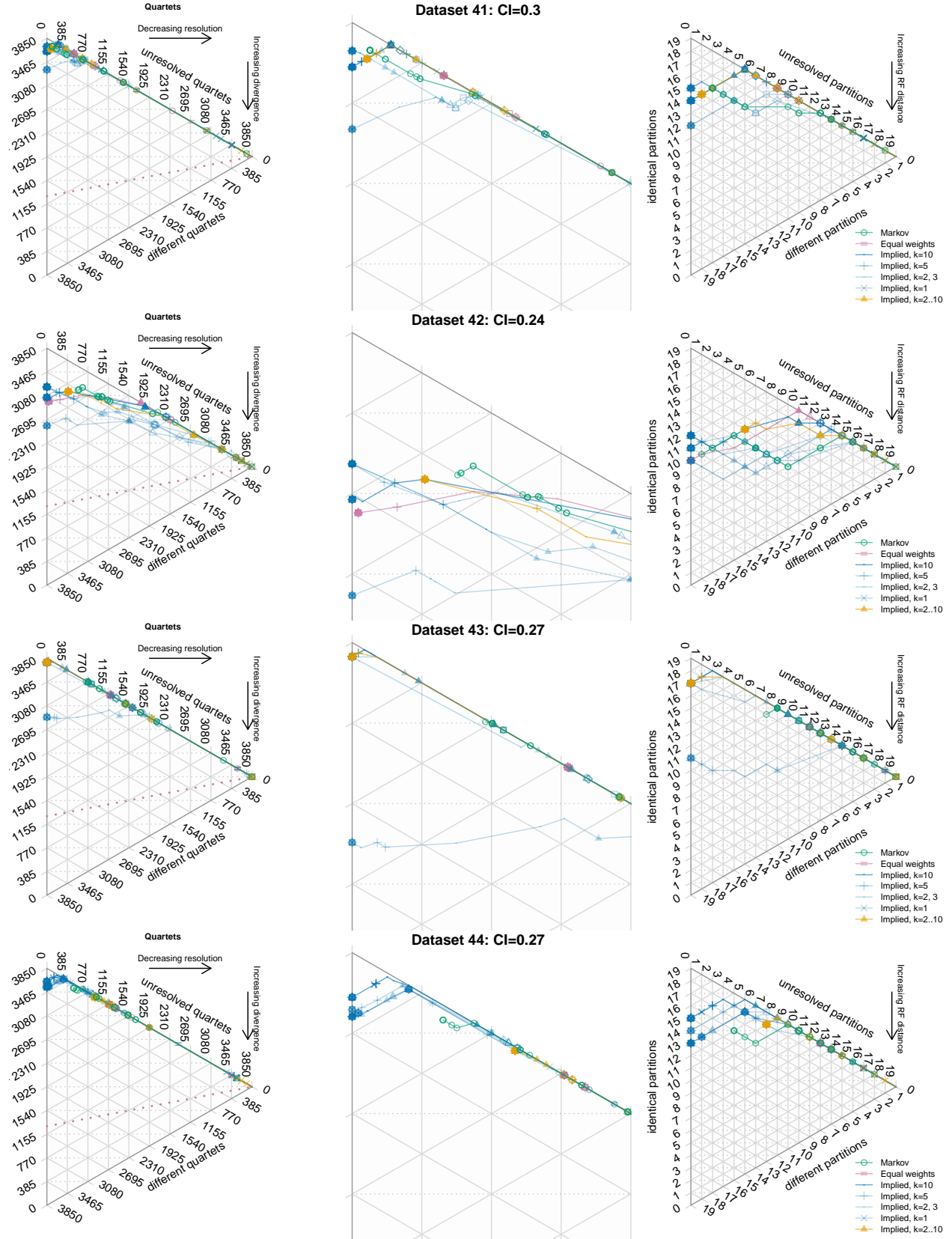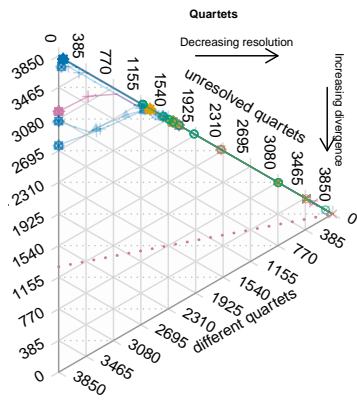
Dataset 44: CI=0.27
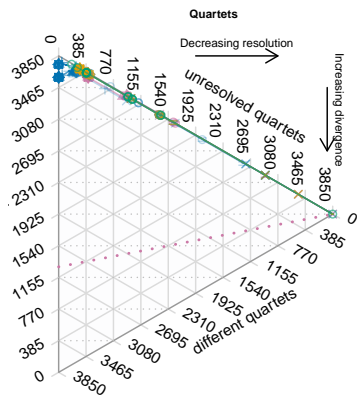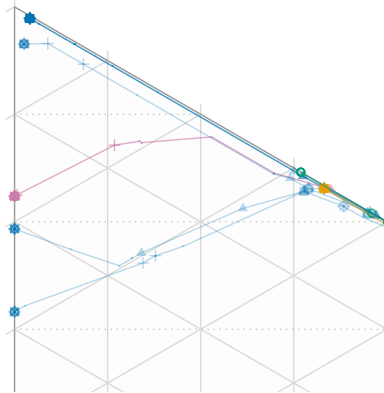
Dataset 45: CI=0.27

Dataset 46: CI=0.24
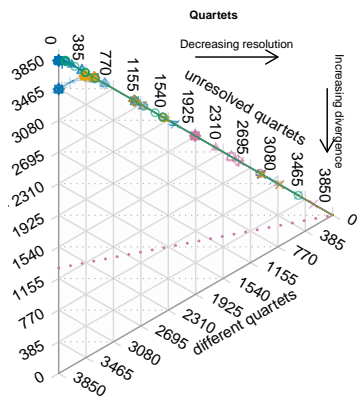
Dataset 47: CI=0.29

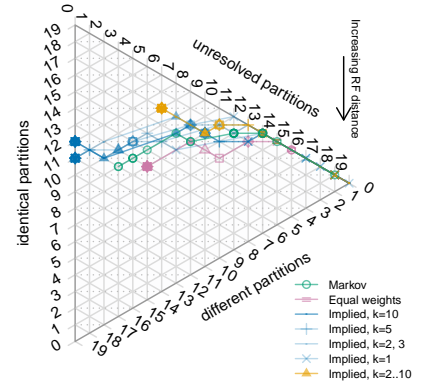**Dataset 48: CI=0.27**

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Dataset 49: CI=0.28

Dataset 50: CI=0.25
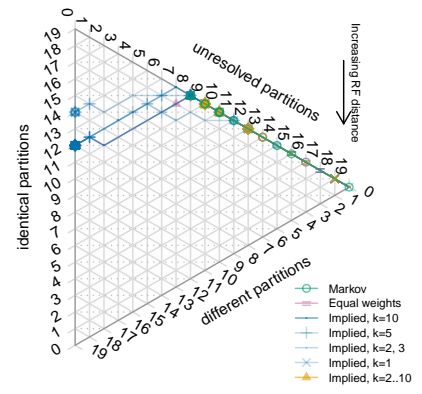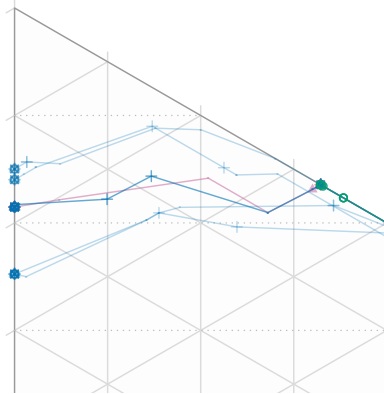
Legend:
- Markov
- Equal weights
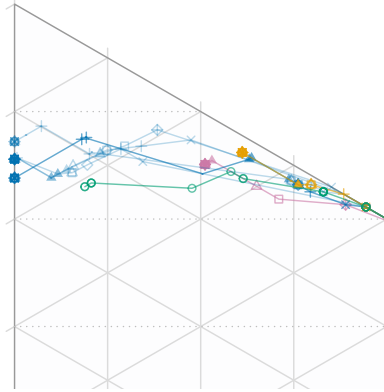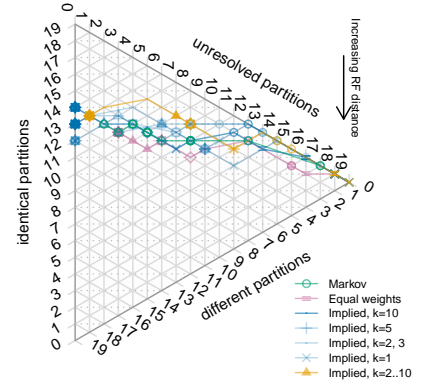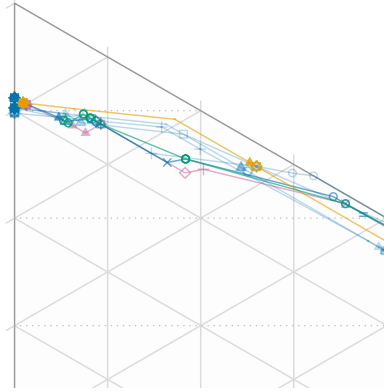- Implied, k=10
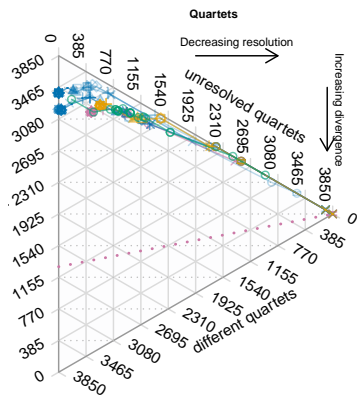- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10
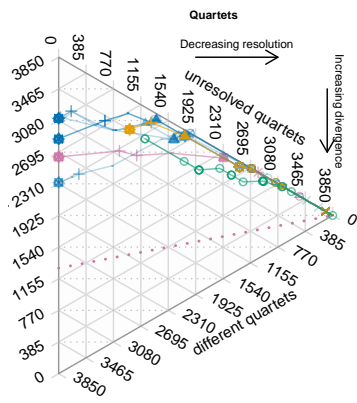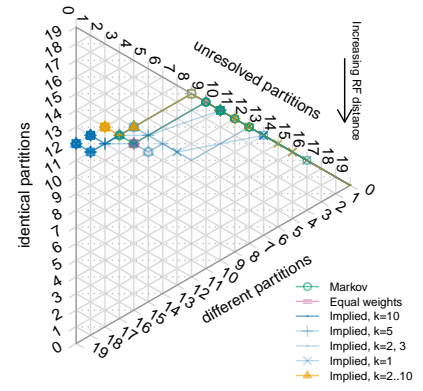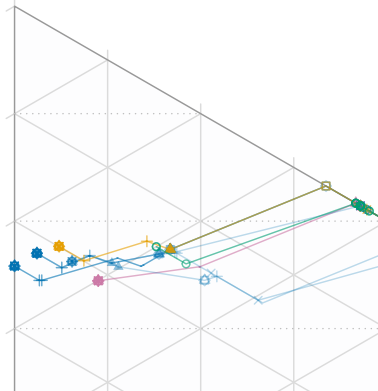
Dataset 51: CI=0.3

Dataset 52: CI=0.25
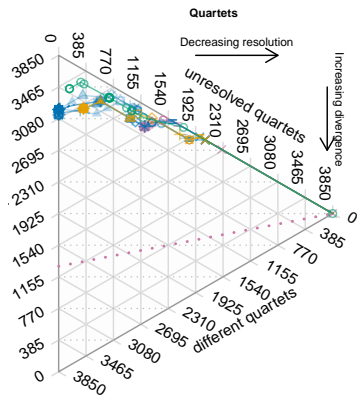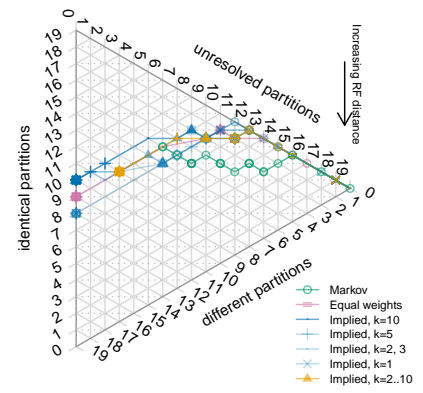
Dataset 53: CI=0.25
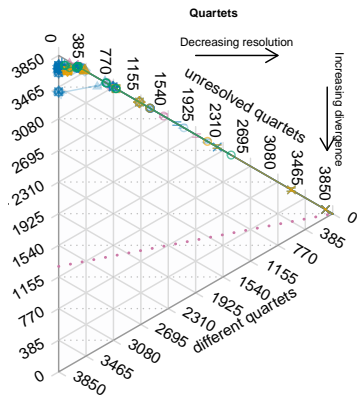
Dataset 54: CI=0.28

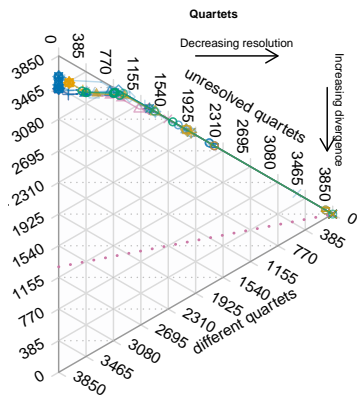**Dataset 55: CI=0.28**
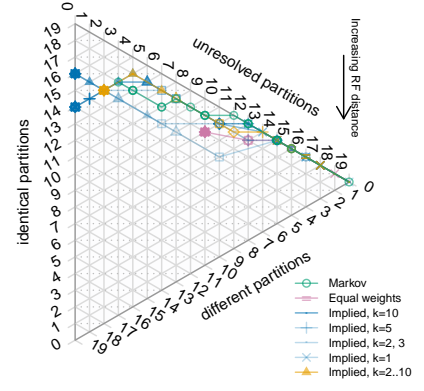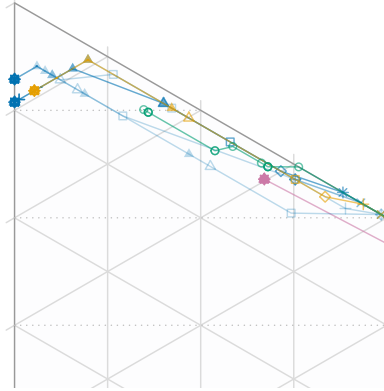
Dataset 56: CI=0.31
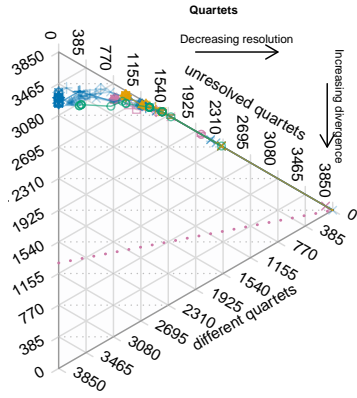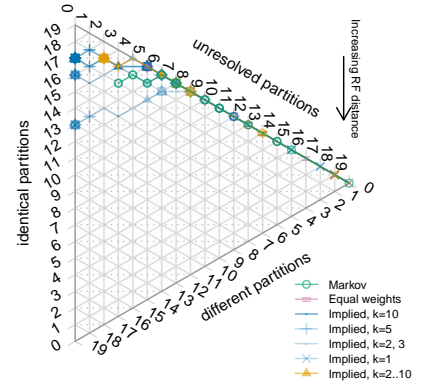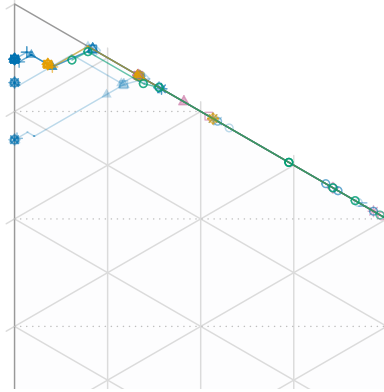
Dataset 57: CI=0.25

Dataset 58: CI=0.25
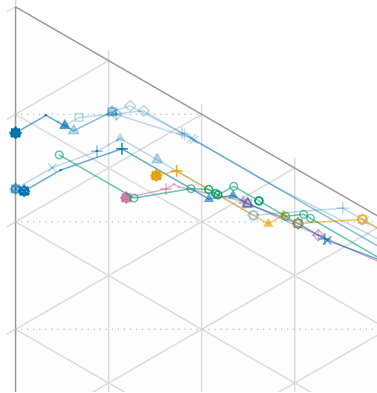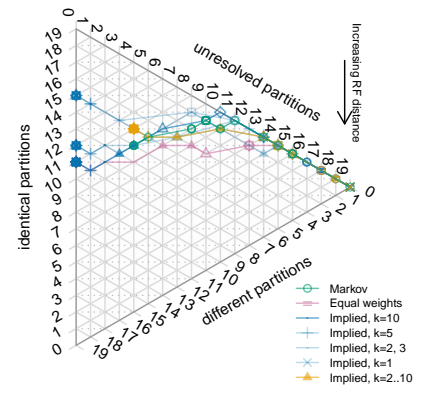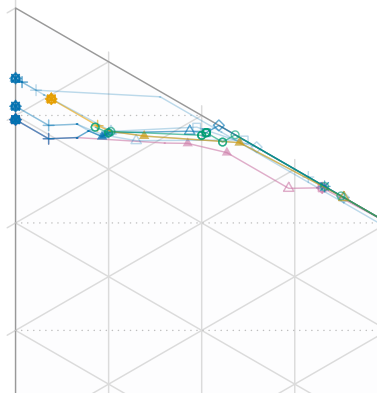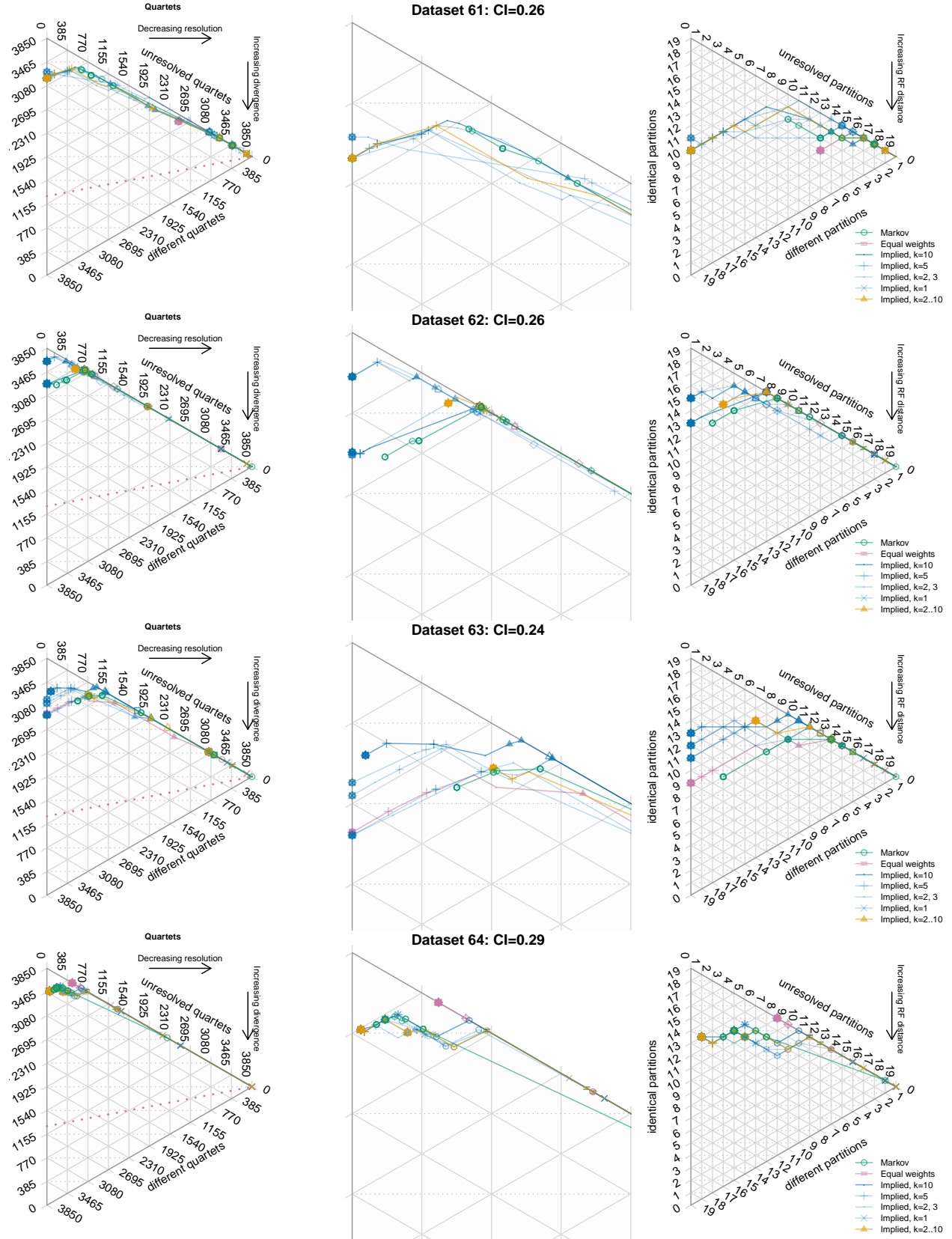
18

Quartets

Decreasing resolution →

Increasing divergence

unresolved quartets

different quartets

Dataset 59: CI=0.26

Increasing RF distance

unresolved partitions

identical partitions

different partitions

- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

Quartets

Decreasing resolution →

Increasing divergence

unresolved quartets

different quartets

Dataset 60: CI=0.24

Increasing RF distance

unresolved partitions

identical partitions

different partitions

- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

Dataset 61: CI=0.26

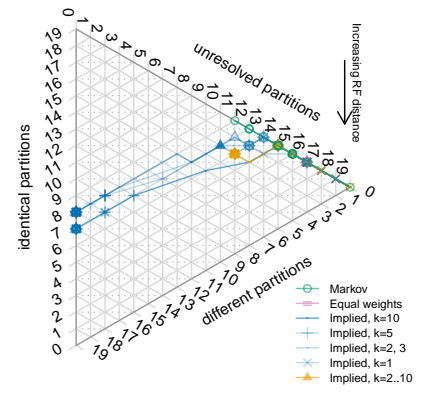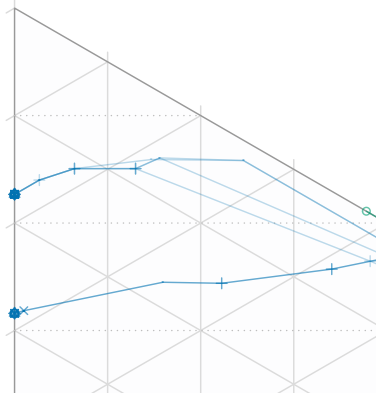**Dataset 62: CI=0.26**

Dataset 63: CI=0.24

Dataset 64: CI=0.29

Dataset 65: CI=0.25

Dataset 66: CI=0.27
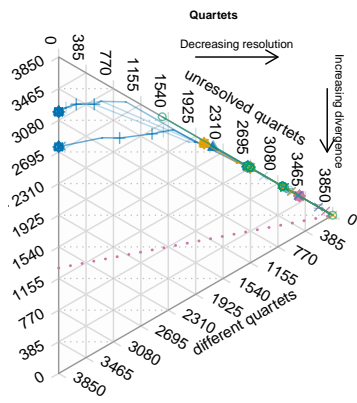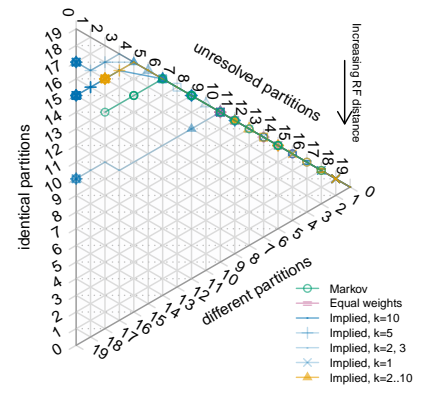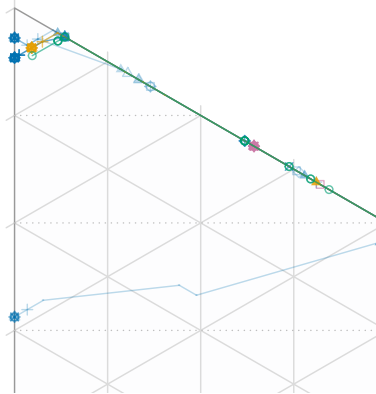
Dataset 67: CI=0.26

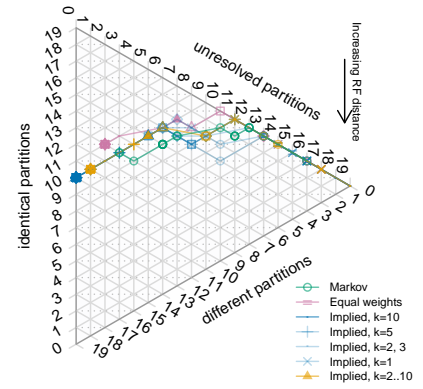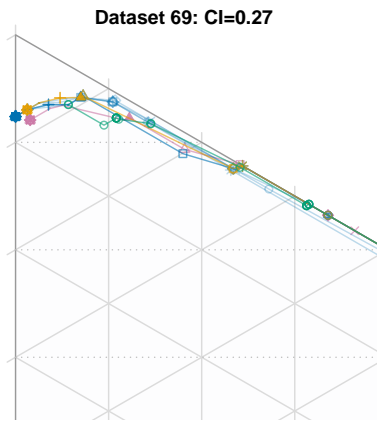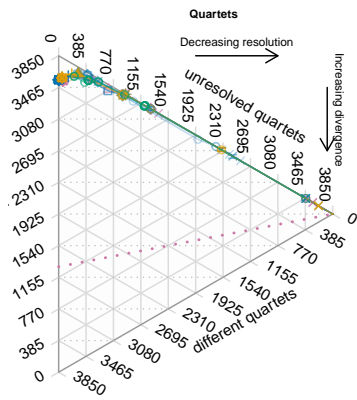Dataset 68: CI=0.31

Quartets

Decreasing resolution →

Increasing divergence

unresolved quartets

different quartets

Dataset 69: CI=0.27

Increasing RF distance

unresolved partitions

identical partitions

different partitions

Markov
Equal weights
Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

Quartets

Decreasing resolution →

Increasing divergence

unresolved quartets

different quartets

Dataset 70: CI=0.27

Increasing RF distance

unresolved partitions

identical partitions

different partitions

Markov
Equal weights
Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

Dataset 71: CI=0.27
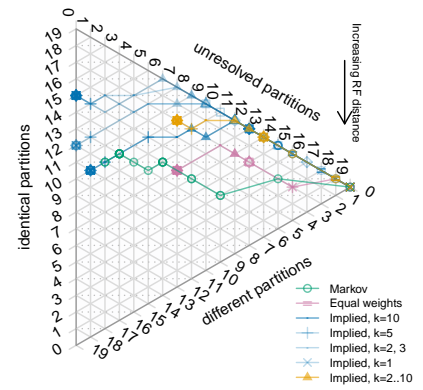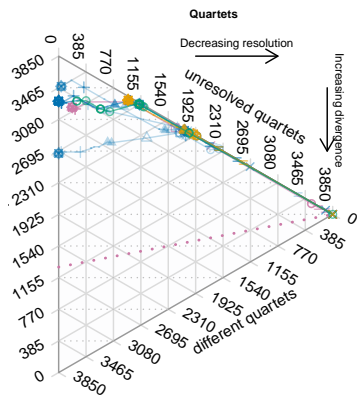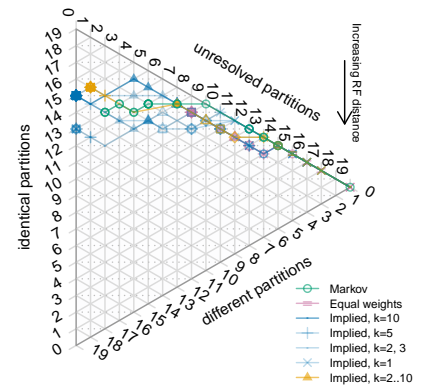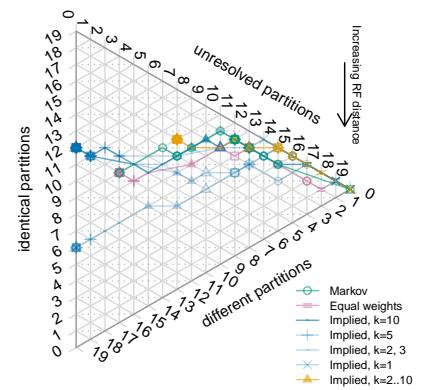
Dataset 72: CI=0.29

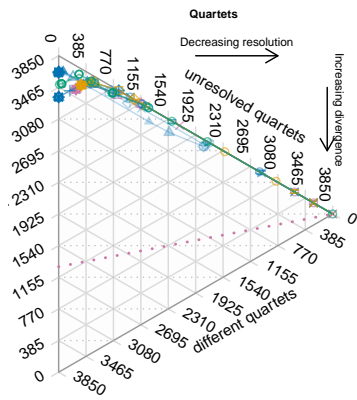**Dataset 73: CI=0.28**

Dataset 74: CI=0.28
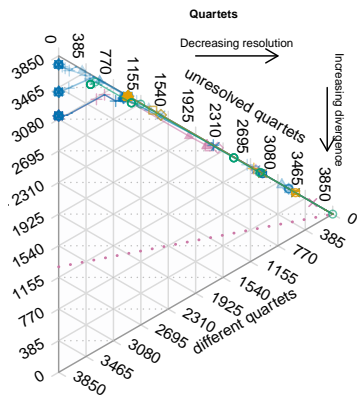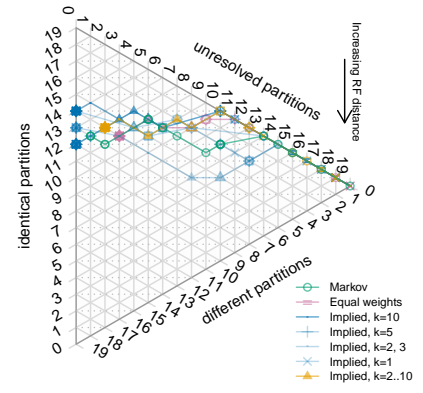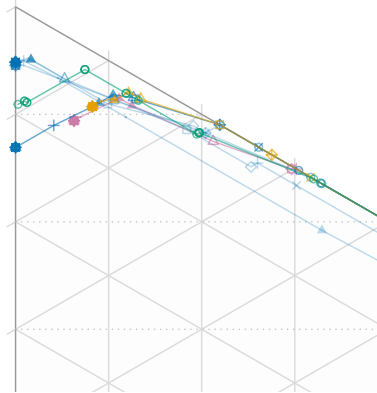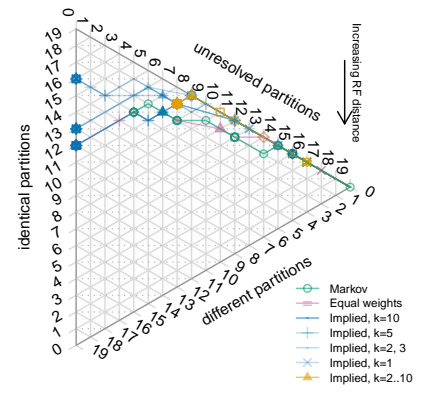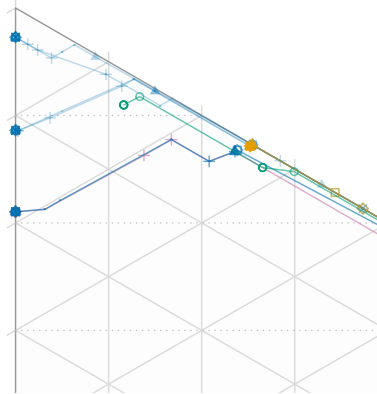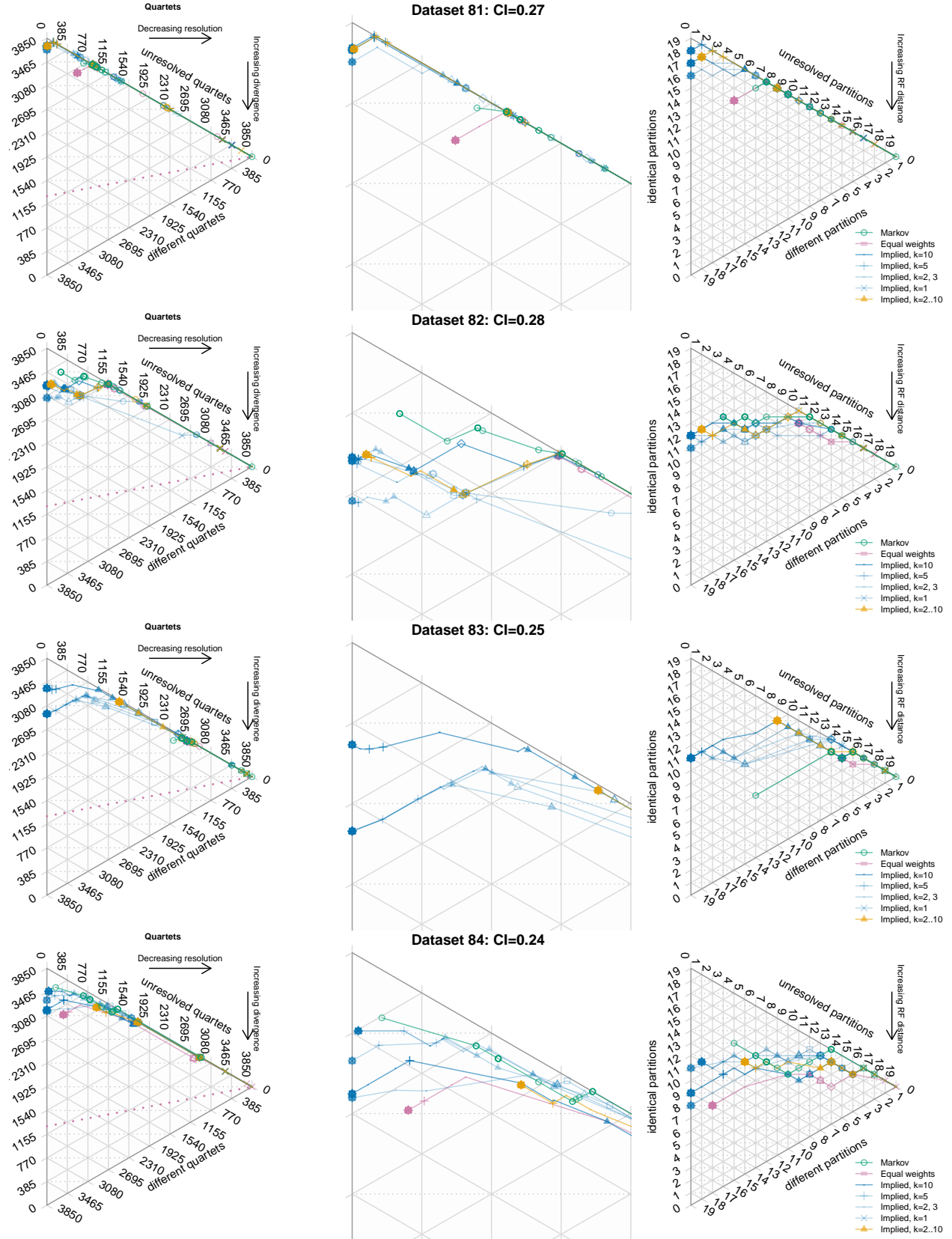
Dataset 75: CI=0.24

Dataset 76: CI=0.26
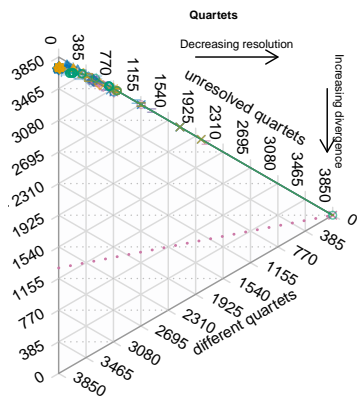
Dataset 77: CI=0.28

Dataset 78: CI=0.24

24

Dataset 79: CI=0.24

Dataset 80: CI=0.27

Markov
Equal weights
Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

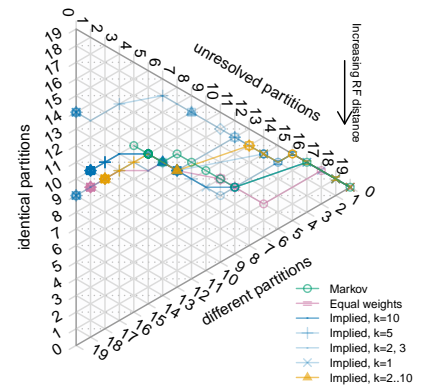**Dataset 81: CI=0.27**

Dataset 82: CI=0.28

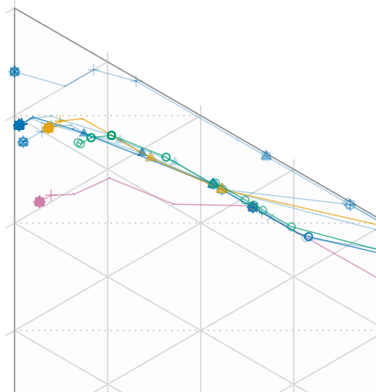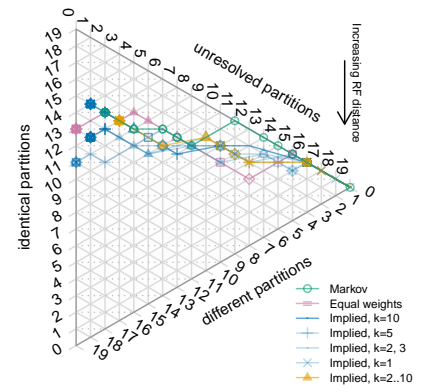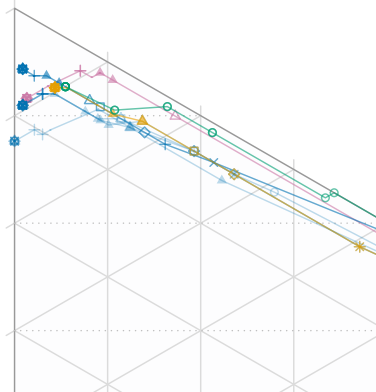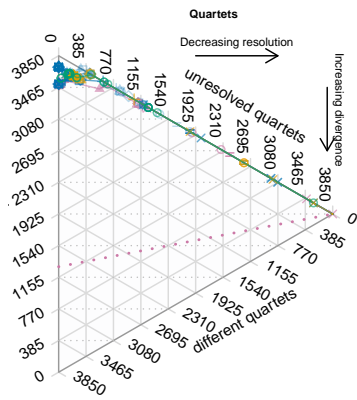**Dataset 83: CI=0.25**
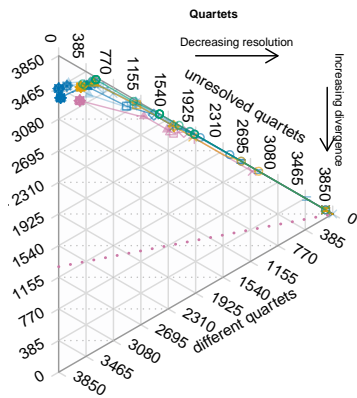
Dataset 84: CI=0.24
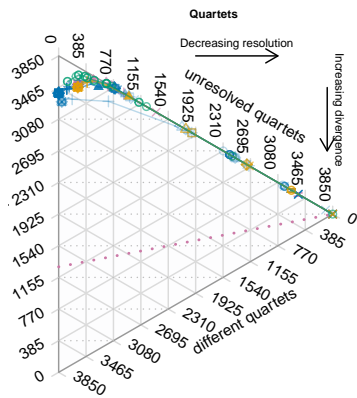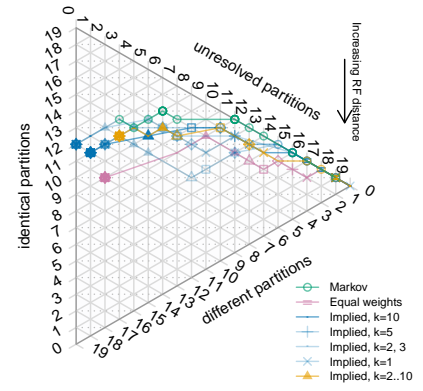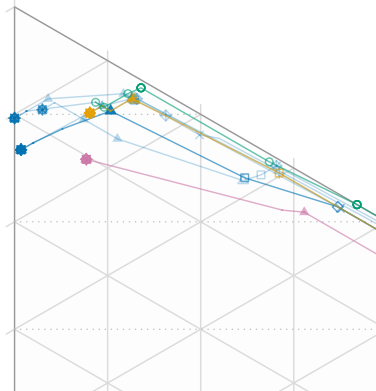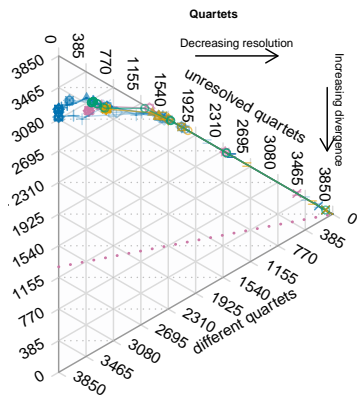
Dataset 85: CI=0.27

Dataset 86: CI=0.27
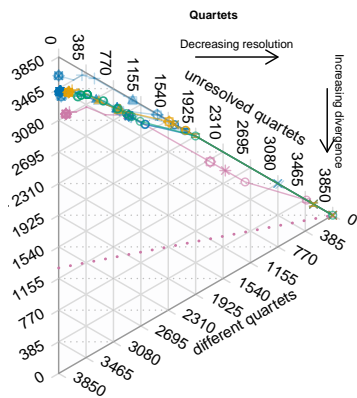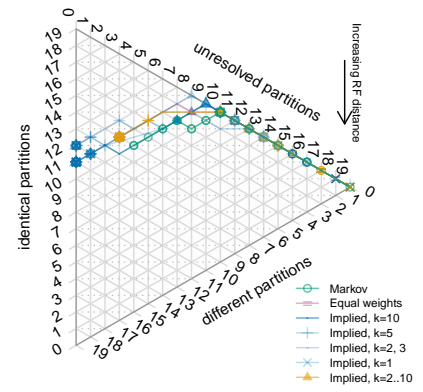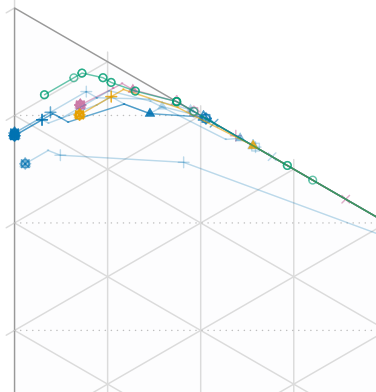
Dataset 87: CI=0.23

Dataset 88: CI=0.25

Legend (repeated in each right-hand panel):
- Markov
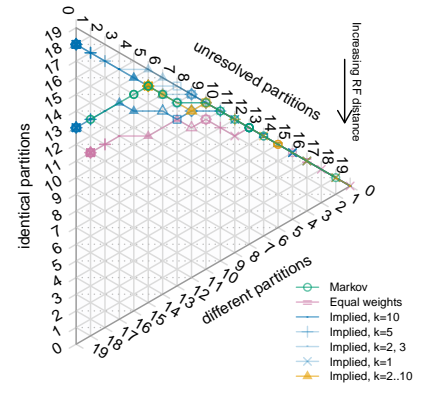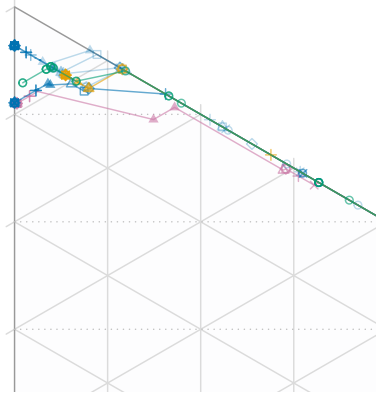- Equal weights
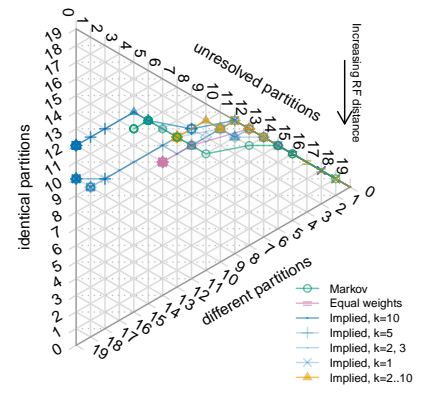- Implied, k=10
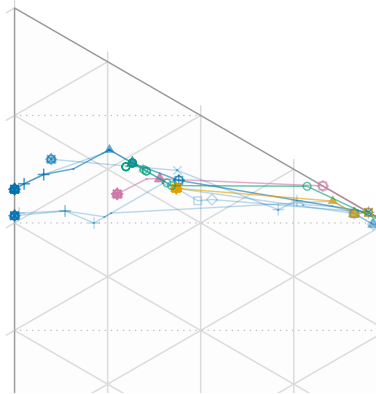- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10
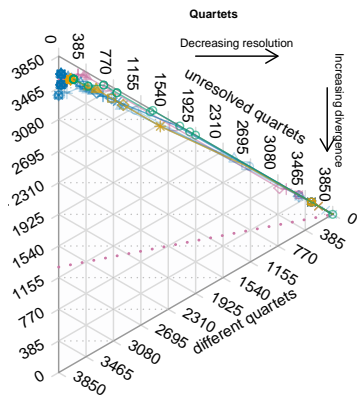
Dataset 89: CI=0.27

Dataset 90: CI=0.26

Dataset 91: CI=0.26

Dataset 92: CI=0.25

Dataset 93: CI=0.28
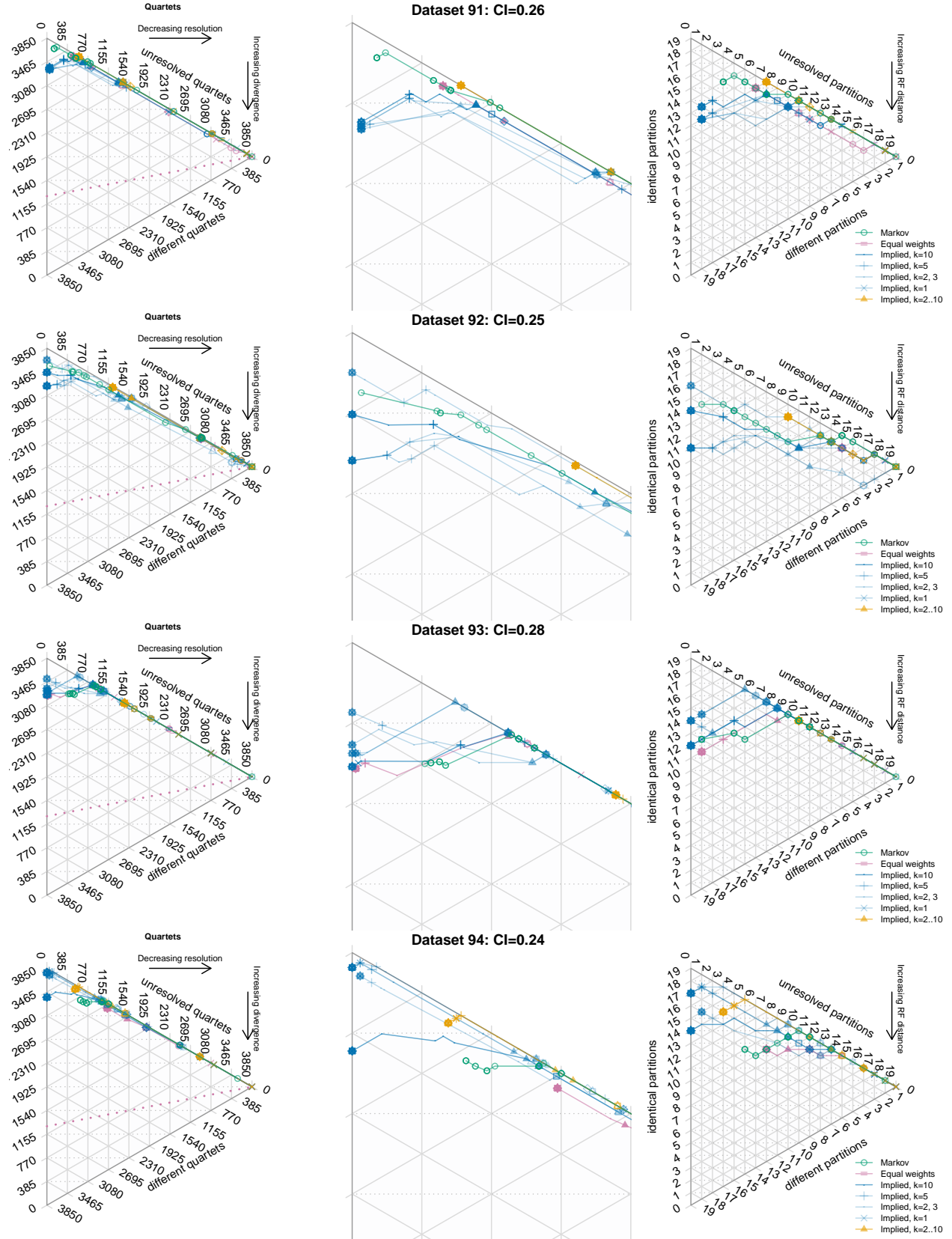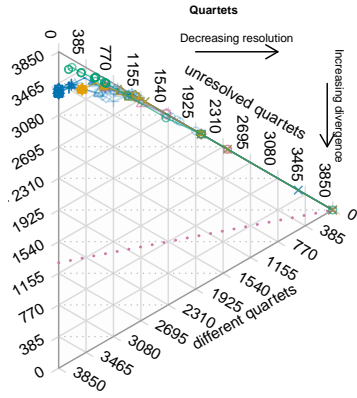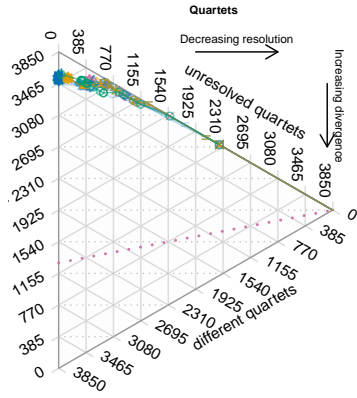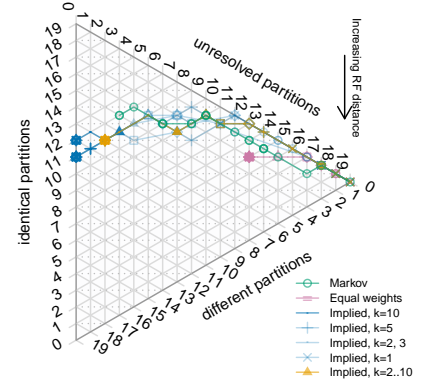

Dataset 94: CI=0.24

Dataset 95: CI=0.24

Dataset 96: CI=0.26
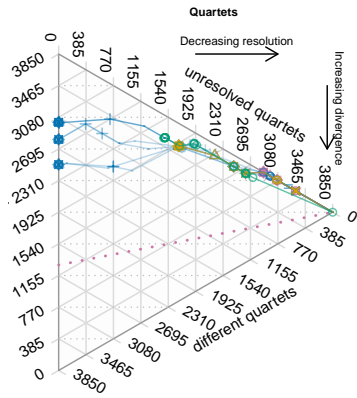
Dataset 97: CI=0.27
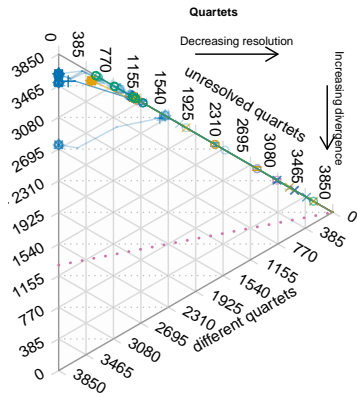
Dataset 98: CI=0.26

References

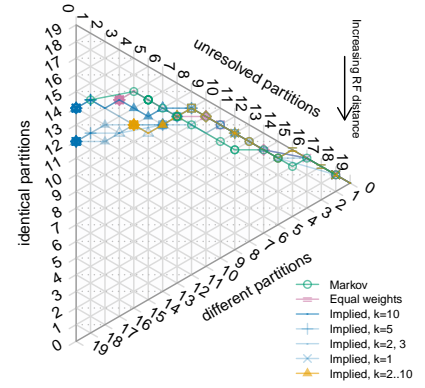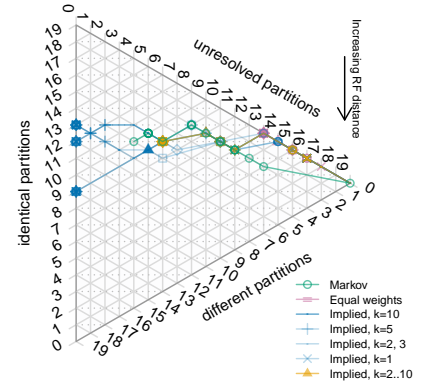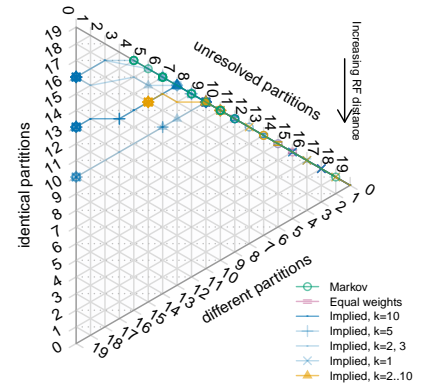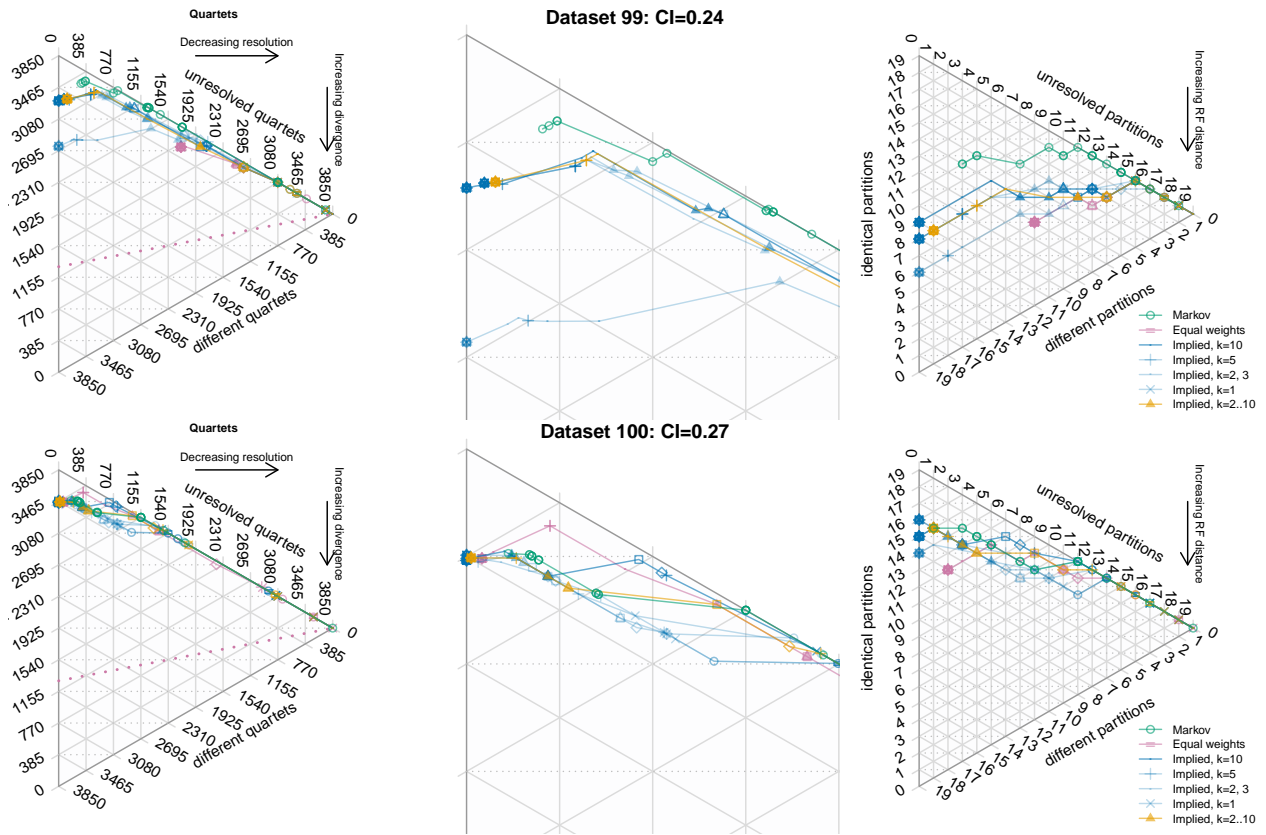1. Congreve CR, Lamsdell JC. 2016 Implied weighting and its utility in palaeontological datasets: a study using modelled phylogenetic matrices. *Palaeontology* **59**, 447–465. (doi:10.1111/pala.12236)

2. Smith MR. 2019 Bayesian and parsimony approaches reconstruct informative trees from simulated morphological datasets. *Biology Letters* **15**, 20180632. (doi:10.1098/rsbl.2018.0632)