

## Appendix A

# Clustering Metrics for Standard versus Hybrid Distances

This appendix gives detailed results for the experiments conducted in Chapter 3, Section 3.5. In particular, it gives clustering metrics for each test case, along with the corresponding choice of experimental inputs. The results are presented Tables A-1 through A-10, corresponding to the 10 data sets employed.

**Table A-1: Clustering metrics for “Adaptive Optics” data set. Red and black text marks standard-vs-hybrid distance comparisons.**

<b>Linkage</b>	<b>Distances</b>	<b>Frequent itemsets</b>	<b>Clustering metric</b>
complete	pairwise	$o_3, k = 1$	1.0000
complete	$o_3^4$	$o_3, k = 1$	1.0000
complete	$o_3^6$	$o_3, k = 1$	1.0000
average	pairwise	$o_3, k = 1$	1.0000
average	$o_3^4$	$o_3, k = 1$	1.0000
average	$o_3^6$	$o_3, k = 1$	1.0000
single	pairwise	$o_3, k = 1$	1.0000
single	$o_3^4$	$o_3, k = 1$	1.0000
single	$o_3^6$	$o_3, k = 1$	1.0000
complete	pairwise	$o_3, k = 5$	0.4306
complete	$o_3^4$	$o_3, k = 5$	0.3050
complete	$o_3^6$	$o_3, k = 5$	0.3050
average	pairwise	$o_3, k = 5$	0.6033
average	$o_3^4$	$o_3, k = 5$	0.6075
average	$o_3^6$	$o_3, k = 5$	0.6075

single	pairwise	$o_3, k = 5$	0.5067
single	$o_3^4$	$o_3, k = 5$	0.6557
single	$o_3^6$	$o_3, k = 5$	0.6557
complete	pairwise	$o_3, k = 10$	0.5203
complete	$o_3^4$	$o_3, k = 10$	0.3400
complete	$o_3^6$	$o_3, k = 10$	0.3400
average	pairwise	$o_3, k = 10$	0.6183
average	$o_3^4$	$o_3, k = 10$	0.5625
average	$o_3^6$	$o_3, k = 10$	0.5625
single	pairwise	$o_3, k = 10$	0.2950
single	$o_3^4$	$o_3, k = 10$	0.4229
single	$o_3^6$	$o_3, k = 10$	0.4216
complete	pairwise	$o_4, k = 1$	1.0000
complete	$o_4^4$	$o_4, k = 1$	0.6667
complete	$o_4^6$	$o_4, k = 1$	0.6667
average	pairwise	$o_4, k = 1$	1.0000
average	$o_4^4$	$o_4, k = 1$	0.6667
average	$o_4^6$	$o_4, k = 1$	0.6667
single	pairwise	$o_4, k = 1$	0.0833
single	$o_4^4$	$o_4, k = 1$	0.2500
single	$o_4^6$	$o_4, k = 1$	0.2500
complete	pairwise	$o_4, k = 5$	0.2533
complete	$o_4^4$	$o_4, k = 5$	0.1867
complete	$o_4^6$	$o_4, k = 5$	0.1867
average	pairwise	$o_4, k = 5$	0.3778
average	$o_4^4$	$o_4, k = 5$	0.2667
average	$o_4^6$	$o_4, k = 5$	0.3333
single	pairwise	$o_4, k = 5$	0.1111
single	$o_4^4$	$o_4, k = 5$	0.2500
single	$o_4^6$	$o_4, k = 5$	0.2500
complete	pairwise	$o_4, k = 10$	0.4169
complete	$o_4^4$	$o_4, k = 10$	0.4533
complete	$o_4^6$	$o_4, k = 10$	0.4533
average	pairwise	$o_4, k = 10$	0.4803
average	$o_4^4$	$o_4, k = 10$	0.4933

average	$o_4^6$	$o_4, k = 10$	0.5267
single	pairwise	$o_4, k = 10$	0.0972
single	$o_4^4$	$o_4, k = 10$	0.2183
single	$o_4^6$	$o_4, k = 10$	0.2412

**Table A-2: Clustering metrics with bibliographic coupling for “Adaptive Optics” data set. Red and black text marks standard-versus-hybrid distance comparisons.**

<b>Linkage</b>	<b>Distances</b>	<b>Frequent itemsets</b>	<b>Clustering metric</b>
complete	pairwise	$o_3, k = 1$	0.7500
complete	$o_3^4$	$o_3, k = 1$	0.7500
average	pairwise	$o_3, k = 1$	<b>0.7500</b>
average	$o_3^4$	$o_3, k = 1$	<b>0.7500</b>
single	pairwise	$o_3, k = 1$	0.7500
single	$o_3^4$	$o_3, k = 1$	1.0000
complete	pairwise	$o_3, k = 5$	<b>0.4700</b>
complete	$o_3^4$	$o_3, k = 5$	<b>0.5800</b>
average	pairwise	$o_3, k = 5$	0.6000
average	$o_3^4$	$o_3, k = 5$	0.6557
single	pairwise	$o_3, k = 5$	<b>0.5167</b>
single	$o_3^4$	$o_3, k = 5$	<b>0.6857</b>
complete	pairwise	$o_3, k = 10$	0.3750
complete	$o_3^4$	$o_3, k = 10$	0.4400
average	pairwise	$o_3, k = 10$	<b>0.5028</b>
average	$o_3^4$	$o_3, k = 10$	<b>0.5704</b>
single	pairwise	$o_3, k = 10$	0.4500
single	$o_3^4$	$o_3, k = 10$	0.5926
complete	pairwise	$o_4, k = 1$	<b>1.0000</b>
complete	$o_4^4$	$o_4, k = 1$	<b>0.0667</b>
complete	$o_4^6$	$o_4, k = 1$	<b>1.0000</b>
average	pairwise	$o_4, k = 1$	1.0000
average	$o_4^4$	$o_4, k = 1$	0.3333
average	$o_4^6$	$o_4, k = 1$	1.0000
single	pairwise	$o_4, k = 1$	<b>1.0000</b>
single	$o_4^4$	$o_4, k = 1$	<b>0.3333</b>
single	$o_4^6$	$o_4, k = 1$	<b>1.0000</b>
complete	pairwise	$o_4, k = 5$	0.2533
complete	$o_4^4$	$o_4, k = 5$	0.3333
complete	$o_4^6$	$o_4, k = 5$	0.2533

average	pairwise	$o_4, k = 5$	0.3882
average	$o_4^4$	$o_4, k = 5$	0.3867
average	$o_4^6$	$o_4, k = 5$	0.4667
single	pairwise	$o_4, k = 5$	0.3778
single	$o_4^4$	$o_4, k = 5$	0.3576
single	$o_4^6$	$o_4, k = 5$	0.4667
complete	pairwise	$o_4, k = 10$	0.1600
complete	$o_4^4$	$o_4, k = 10$	0.2667
complete	$o_4^6$	$o_4, k = 10$	0.1600
average	pairwise	$o_4, k = 10$	0.3714
average	$o_4^4$	$o_4, k = 10$	0.3907
average	$o_4^6$	$o_4, k = 10$	0.3774
single	pairwise	$o_4, k = 10$	0.3000
single	$o_4^4$	$o_4, k = 10$	0.3566
single	$o_4^6$	$o_4, k = 10$	0.4320

**Table A-3: Clustering metrics for “Collagen” data set. Red and black text marks standard-versus-hybrid distance comparisons.**

<b>Linkage</b>	<b>Distances</b>	<b>Frequent itemsets</b>	<b>Clustering metric</b>
complete	pairwise	$o_3, k = 1$	0.6000
complete	$o_3^4$	$o_3, k = 1$	1.0000
average	pairwise	$o_3, k = 1$	0.6000
average	$o_3^4$	$o_3, k = 1$	1.0000
single	pairwise	$o_3, k = 1$	0.3750
single	$o_3^4$	$o_3, k = 1$	1.0000
complete	pairwise	$o_3, k = 5$	0.5713
complete	$o_3^4$	$o_3, k = 5$	0.7557
average	pairwise	$o_3, k = 5$	0.7100
average	$o_3^4$	$o_3, k = 5$	0.7700
single	pairwise	$o_3, k = 5$	0.5450
single	$o_3^4$	$o_3, k = 5$	0.7900
complete	pairwise	$o_3, k = 10$	0.5990
complete	$o_3^4$	$o_3, k = 10$	0.6854
average	pairwise	$o_3, k = 10$	0.6779
average	$o_3^4$	$o_3, k = 10$	0.7050
single	pairwise	$o_3, k = 10$	0.4600
single	$o_3^4$	$o_3, k = 10$	0.7150
complete	pairwise	$o_4, k = 1$	0.8000
complete	$o_4^4$	$o_4, k = 1$	1.0000
average	pairwise	$o_4, k = 1$	0.8000
average	$o_4^4$	$o_4, k = 1$	1.0000
single	pairwise	$o_4, k = 1$	0.5000
single	$o_4^4$	$o_4, k = 1$	1.0000
complete	pairwise	$o_4, k = 5$	0.5867
complete	$o_4^4$	$o_4, k = 5$	0.6429
average	pairwise	$o_4, k = 5$	0.6629
average	$o_4^4$	$o_4, k = 5$	0.7000
single	pairwise	$o_4, k = 5$	0.3000
single	$o_4^4$	$o_4, k = 5$	0.7000
complete	pairwise	$o_4, k = 10$	0.5511

complete	$o_4^4$	$o_4, k = 10$	0.5873
average	pairwise	$o_4, k = 10$	0.6424
average	$o_4^4$	$o_4, k = 10$	0.6533
single	pairwise	$o_4, k = 10$	0.3000
single	$o_4^4$	$o_4, k = 10$	0.6533

**Table A-4: Clustering metrics for “Genetic Algorithms and Neural Networks” data set. Red and black text marks standard-versus-hybrid distance comparisons.**

<b>Linkage</b>	<b>Distances</b>	<b>Frequent itemsets</b>	<b>Clustering metric</b>
complete	pairwise	$o_3, k = 1$	0.0526
complete	$o_3^4$	$o_3, k = 1$	0.0526
complete	$o_3^6$	$o_3, k = 1$	1.0000
average	pairwise	$o_3, k = 1$	0.5000
average	$o_3^4$	$o_3, k = 1$	0.2143
average	$o_3^6$	$o_3, k = 1$	1.0000
single	pairwise	$o_3, k = 1$	0.3000
single	$o_3^4$	$o_3, k = 1$	0.7500
single	$o_3^6$	$o_3, k = 1$	1.0000
complete	pairwise	$o_3, k = 5$	0.1088
complete	$o_3^4$	$o_3, k = 5$	0.4105
complete	$o_3^6$	$o_3, k = 5$	0.6800
average	pairwise	$o_3, k = 5$	0.4771
average	$o_3^4$	$o_3, k = 5$	0.4429
average	$o_3^6$	$o_3, k = 5$	0.6800
single	pairwise	$o_3, k = 5$	0.1350
single	$o_3^4$	$o_3, k = 5$	0.4500
single	$o_3^6$	$o_3, k = 5$	0.6800
complete	pairwise	$o_3, k = 10$	0.2035
complete	$o_3^4$	$o_3, k = 10$	0.5053
complete	$o_3^6$	$o_3, k = 10$	0.6800
average	pairwise	$o_3, k = 10$	0.2035
average	$o_3^4$	$o_3, k = 10$	0.5214
average	$o_3^6$	$o_3, k = 10$	0.6800
single	pairwise	$o_3, k = 10$	0.1144
single	$o_3^4$	$o_3, k = 10$	0.3964
single	$o_3^6$	$o_3, k = 10$	0.4214
complete	pairwise	$o_4, k = 1$	0.0702
complete	$o_4^4$	$o_4, k = 1$	0.6667

average	pairwise	$o_4, k = 1$	0.5714
average	$o_4^4$	$o_4, k = 1$	0.6667
single	pairwise	$o_4, k = 1$	0.1250
single	$o_4^4$	$o_4, k = 1$	0.6667
complete	pairwise	$o_4, k = 5$	0.1450
complete	$o_4^4$	$o_4, k = 5$	0.6667
average	pairwise	$o_4, k = 5$	0.6171
average	$o_4^4$	$o_4, k = 5$	0.6667
single	pairwise	$o_4, k = 5$	0.1250
single	$o_4^4$	$o_4, k = 5$	0.6667
complete	pairwise	$o_4, k = 10$	0.1450
complete	$o_4^4$	$o_4, k = 10$	0.6333
average	pairwise	$o_4, k = 10$	0.4286
average	$o_4^4$	$o_4, k = 10$	0.6444
single	pairwise	$o_4, k = 10$	0.1250
single	$o_4^4$	$o_4, k = 10$	0.6444

**Table A-5: Clustering metrics for “Quantum Gravity and Strings” data set. Red and black text marks standard-versus-hybrid distance comparisons.**

<b>Linkage</b>	<b>Distances</b>	<b>Frequent itemsets</b>	<b>Clustering metric</b>
complete	pairwise	$o_3, k = 1$	1.0000
complete	$o_3^4$	$o_3, k = 1$	1.0000
average	pairwise	$o_3, k = 1$	1.0000
average	$o_3^4$	$o_3, k = 1$	1.0000
single	pairwise	$o_3, k = 1$	1.0000
single	$o_3^4$	$o_3, k = 1$	1.0000
complete	pairwise	$o_3, k = 5$	0.9000
complete	$o_3^4$	$o_3, k = 5$	0.9500
average	pairwise	$o_3, k = 5$	0.9000
average	$o_3^4$	$o_3, k = 5$	0.9500
single	pairwise	$o_3, k = 5$	0.9000
single	$o_3^4$	$o_3, k = 5$	0.9500
complete	pairwise	$o_3, k = 10$	0.7123
complete	$o_3^4$	$o_3, k = 10$	0.7545
average	pairwise	$o_3, k = 10$	0.7425
average	$o_3^4$	$o_3, k = 10$	0.7975
single	pairwise	$o_3, k = 10$	0.6857
single	$o_3^4$	$o_3, k = 10$	0.8029
complete	pairwise	$o_4, k = 1$	0.6667
complete	$o_4^4$	$o_4, k = 1$	1.0000
average	pairwise	$o_4, k = 1$	0.8000
average	$o_4^4$	$o_4, k = 1$	1.0000
single	pairwise	$o_4, k = 1$	0.5714
single	$o_4^4$	$o_4, k = 1$	1.0000
complete	pairwise	$o_4, k = 5$	0.7394
complete	$o_4^4$	$o_4, k = 5$	0.8061
average	pairwise	$o_4, k = 5$	0.7933
average	$o_4^4$	$o_4, k = 5$	0.7476
single	pairwise	$o_4, k = 5$	0.7286
single	$o_4^4$	$o_4, k = 5$	0.7822

complete	pairwise	$o_4, k = 10$	<b>0.7030</b>
complete	$o_4^4$	$o_4, k = 10$	<b>0.7364</b>
average	pairwise	$o_4, k = 10$	0.7433
average	$o_4^4$	$o_4, k = 10$	0.7205
single	pairwise	$o_4, k = 10$	<b>0.6500</b>
single	$o_4^4$	$o_4, k = 10$	<b>0.7378</b>

**Table A-6: Clustering metrics with bibliographic coupling for “Quantum Gravity and Strings” data set. Red and black text marks standard-versus-hybrid distance comparisons.**

<b>Linkage</b>	<b>Distances</b>	<b>Frequent itemsets</b>	<b>Clustering metric</b>
complete	pairwise	$o_3, k = 1$	0.3000
complete	$o_3^4$	$o_3, k = 1$	0.3750
average	pairwise	$o_3, k = 1$	1.0000
average	$o_3^4$	$o_3, k = 1$	1.0000
single	pairwise	$o_3, k = 1$	1.0000
single	$o_3^4$	$o_3, k = 1$	1.0000
complete	pairwise	$o_3, k = 5$	0.5800
complete	$o_3^4$	$o_3, k = 5$	0.6250
average	pairwise	$o_3, k = 5$	0.7357
average	$o_3^4$	$o_3, k = 5$	0.7700
single	pairwise	$o_3, k = 5$	0.7214
single	$o_3^4$	$o_3, k = 5$	0.7700
complete	pairwise	$o_3, k = 10$	0.4850
complete	$o_3^4$	$o_3, k = 10$	0.5000
average	pairwise	$o_3, k = 10$	0.6636
average	$o_3^4$	$o_3, k = 10$	0.6779
single	pairwise	$o_3, k = 10$	0.6393
single	$o_3^4$	$o_3, k = 10$	0.6779
complete	pairwise	$o_4, k = 1$	0.4000
complete	$o_4^4$	$o_4, k = 1$	0.0800
complete	$o_4^6$	$o_4, k = 1$	0.5000
average	pairwise	$o_4, k = 1$	0.5714
average	$o_4^4$	$o_4, k = 1$	0.6667
average	$o_4^6$	$o_4, k = 1$	0.6667
single	pairwise	$o_4, k = 1$	0.5714
single	$o_4^4$	$o_4, k = 1$	0.6667
single	$o_4^6$	$o_4, k = 1$	0.6667
complete	pairwise	$o_4, k = 5$	0.3360
complete	$o_4^4$	$o_4, k = 5$	0.2640

complete	$o_4^6$	$o_4, k = 5$	0.5889
average	pairwise	$o_4, k = 5$	0.5152
average	$o_4^4$	$o_4, k = 5$	0.5933
average	$o_4^6$	$o_4, k = 5$	0.6156
single	pairwise	$o_4, k = 5$	0.4962
single	$o_4^4$	$o_4, k = 5$	0.6137
single	$o_4^6$	$o_4, k = 5$	0.6210
complete	pairwise	$o_4, k = 10$	0.3680
complete	$o_4^4$	$o_4, k = 10$	0.2893
complete	$o_4^6$	$o_4, k = 10$	0.5744
average	pairwise	$o_4, k = 10$	0.6052
average	$o_4^4$	$o_4, k = 10$	0.6600
average	$o_4^6$	$o_4, k = 10$	0.6711
single	pairwise	$o_4, k = 10$	0.5767
single	$o_4^4$	$o_4, k = 10$	0.6702
single	$o_4^6$	$o_4, k = 10$	0.6738

**Table A-7: Clustering metrics for “Wavelets (1-100)” data set. Red and black text marks standard-vs-hybrid distance comparisons.**

<b>Linkage</b>	<b>Distances</b>	<b>Frequent itemsets</b>	<b>Clustering metric</b>
complete	pairwise	$o_3, k = 1$	0.0882
complete	$o_3^4$	$o_3, k = 1$	1.0000
average	pairwise	$o_3, k = 1$	1.0000
average	$o_3^4$	$o_3, k = 1$	1.0000
single	pairwise	$o_3, k = 1$	1.0000
single	$o_3^4$	$o_3, k = 1$	1.0000
complete	pairwise	$o_3, k = 5$	0.5891
complete	$o_3^4$	$o_3, k = 5$	0.8500
average	pairwise	$o_3, k = 5$	0.7200
average	$o_3^4$	$o_3, k = 5$	0.8500
single	pairwise	$o_3, k = 5$	0.5500
single	$o_3^4$	$o_3, k = 5$	0.8500
complete	pairwise	$o_3, k = 10$	0.5374
complete	$o_3^4$	$o_3, k = 10$	0.7000
average	pairwise	$o_3, k = 10$	0.5900
average	$o_3^4$	$o_3, k = 10$	0.7000
single	pairwise	$o_3, k = 10$	0.3480
single	$o_3^4$	$o_3, k = 10$	0.7000
complete	pairwise	$o_4, k = 1$	0.5714
complete	$o_4^4$	$o_4, k = 1$	1.0000
average	pairwise	$o_4, k = 1$	0.4000
average	$o_4^4$	$o_4, k = 1$	1.0000
single	pairwise	$o_4, k = 1$	0.3333
single	$o_4^4$	$o_4, k = 1$	1.0000
complete	pairwise	$o_4, k = 5$	0.5645
complete	$o_4^4$	$o_4, k = 5$	0.8933
average	pairwise	$o_4, k = 5$	0.6400
average	$o_4^4$	$o_4, k = 5$	0.8933
single	pairwise	$o_4, k = 5$	0.1947
single	$o_4^4$	$o_4, k = 5$	0.8267
complete	pairwise	$o_4, k = 10$	0.5940

complete	$o_4^4$	$o_4, k = 10$	0.7584
average	pairwise	$o_4, k = 10$	0.6354
average	$o_4^4$	$o_4, k = 10$	0.7610
single	pairwise	$o_4, k = 10$	0.1773
single	$o_4^4$	$o_4, k = 10$	0.7100

**Table A-8: Clustering metrics for “Wavelets (1-500)” data set. Red and black text marks standard-vs-hybrid distance comparisons.**

<b>Linkage</b>	<b>Distances</b>	<b>Frequent itemsets</b>	<b>Clustering metric</b>
complete	pairwise	$o_3, k = 1$	1.0000
complete	$o_3^4$	$o_3, k = 1$	1.0000
average	pairwise	$o_3, k = 1$	1.0000
average	$o_3^4$	$o_3, k = 1$	1.0000
single	pairwise	$o_3, k = 1$	1.0000
single	$o_3^4$	$o_3, k = 1$	1.0000
complete	pairwise	$o_3, k = 5$	0.5722
complete	$o_3^4$	$o_3, k = 5$	0.8700
average	pairwise	$o_3, k = 5$	0.5972
average	$o_3^4$	$o_3, k = 5$	0.8700
single	pairwise	$o_3, k = 5$	0.4069
single	$o_3^4$	$o_3, k = 5$	0.8700
complete	pairwise	$o_3, k = 10$	0.5222
complete	$o_3^4$	$o_3, k = 10$	0.7800
average	pairwise	$o_3, k = 10$	0.5336
average	$o_3^4$	$o_3, k = 10$	0.7800
single	pairwise	$o_3, k = 10$	0.3609
single	$o_3^4$	$o_3, k = 10$	0.7800
complete	pairwise	$o_4, k = 1$	1.0000
complete	$o_4^4$	$o_4, k = 1$	1.0000
average	pairwise	$o_4, k = 1$	1.0000
average	$o_4^4$	$o_4, k = 1$	1.0000
single	pairwise	$o_4, k = 1$	0.2857
single	$o_4^4$	$o_4, k = 1$	1.0000
complete	pairwise	$o_4, k = 5$	0.2593
complete	$o_4^4$	$o_4, k = 5$	0.8800
average	pairwise	$o_4, k = 5$	0.3296
average	$o_4^4$	$o_4, k = 5$	0.8800
single	pairwise	$o_4, k = 5$	0.2684
single	$o_4^4$	$o_4, k = 5$	0.8800
complete	pairwise	$o_4, k = 10$	0.1667

complete	$o_4^4$	$o_4, k = 10$	0.7867
average	pairwise	$o_4, k = 10$	0.2407
average	$o_4^4$	$o_4, k = 10$	0.7867
single	pairwise	$o_4, k = 10$	0.2277
single	$o_4^4$	$o_4, k = 10$	0.7867

**Table A-9: Clustering metrics for “Wavelets and Brownian” data set. Red and black text marks standard-versus-hybrid distance comparisons.**

Linkage	Distances	Frequent itemsets	Clustering metric
complete	pairwise	$o_3, k = 1$	1.0000
complete	$o_3^4$	$o_3, k = 1$	1.0000
average	pairwise	$o_3, k = 1$	1.0000
average	$o_3^4$	$o_3, k = 1$	1.0000
single	pairwise	$o_3, k = 1$	0.6000
single	$o_3^4$	$o_3, k = 1$	1.0000
complete	pairwise	$o_3, k = 5$	0.5600
complete	$o_3^4$	$o_3, k = 5$	0.6857
average	pairwise	$o_3, k = 5$	0.6857
average	$o_3^4$	$o_3, k = 5$	0.7057
single	pairwise	$o_3, k = 5$	0.5657
single	$o_3^4$	$o_3, k = 5$	0.7057
complete	pairwise	$o_3, k = 10$	0.5800
complete	$o_3^4$	$o_3, k = 10$	0.6479
average	pairwise	$o_3, k = 10$	0.6479
average	$o_3^4$	$o_3, k = 10$	0.6379
single	pairwise	$o_3, k = 10$	0.5314
single	$o_3^4$	$o_3, k = 10$	0.6379
complete	pairwise	$o_4, k = 1$	0.6667
complete	$o_4^4$	$o_4, k = 1$	1.0000
average	pairwise	$o_4, k = 1$	1.0000
average	$o_4^4$	$o_4, k = 1$	1.0000
single	pairwise	$o_4, k = 1$	0.8000
single	$o_4^4$	$o_4, k = 1$	1.0000
complete	pairwise	$o_4, k = 5$	0.6667
complete	$o_4^4$	$o_4, k = 5$	0.8133
average	pairwise	$o_4, k = 5$	0.7600
average	$o_4^4$	$o_4, k = 5$	0.8133
single	pairwise	$o_4, k = 5$	0.7543
single	$o_4^4$	$o_4, k = 5$	0.8133

complete	pairwise	$o_4, k = 10$	0.6810
complete	$o_4^4$	$o_4, k = 10$	0.7343
average	pairwise	$o_4, k = 10$	0.6933
average	$o_4^4$	$o_4, k = 10$	0.7343
single	pairwise	$o_4, k = 10$	0.6514
single	$o_4^4$	$o_4, k = 10$	0.7343

**Table A-10: Clustering metrics with bibliographic coupling for “Wavelets and Brownian” data set. Red and black text marks comparisons for standard versus hybrid distances.**

<b>Linkage</b>	<b>Distances</b>	<b>Frequent itemsets</b>	<b>Clustering metric</b>
complete	pairwise	$o_3, k = 1$	0.0508
complete	$o_3^4$	$o_3, k = 1$	0.1071
average	pairwise	$o_3, k = 1$	<b>0.2500</b>
average	$o_3^4$	$o_3, k = 1$	<b>0.5000</b>
single	pairwise	$o_3, k = 1$	0.2308
single	$o_3^4$	$o_3, k = 1$	0.6000
complete	pairwise	$o_3, k = 5$	<b>0.3305</b>
complete	$o_3^4$	$o_3, k = 5$	<b>0.5129</b>
average	pairwise	$o_3, k = 5$	0.5500
average	$o_3^4$	$o_3, k = 5$	0.7200
single	pairwise	$o_3, k = 5$	<b>0.5923</b>
single	$o_3^4$	$o_3, k = 5$	<b>0.7400</b>
complete	pairwise	$o_3, k = 10$	0.1907
complete	$o_3^4$	$o_3, k = 10$	0.5714
average	pairwise	$o_3, k = 10$	<b>0.3125</b>
average	$o_3^4$	$o_3, k = 10$	<b>0.6825</b>
single	pairwise	$o_3, k = 10$	0.4115
single	$o_3^4$	$o_3, k = 10$	0.6825
complete	pairwise	$o_4, k = 1$	<b>0.0678</b>
complete	$o_4^4$	$o_4, k = 1$	<b>1.0000</b>
average	pairwise	$o_4, k = 1$	0.1000
average	$o_4^4$	$o_4, k = 1$	1.0000
single	pairwise	$o_4, k = 1$	<b>0.3077</b>
single	$o_4^4$	$o_4, k = 1$	<b>1.0000</b>
complete	pairwise	$o_4, k = 5$	0.0678
complete	$o_4^4$	$o_4, k = 5$	0.6450
average	pairwise	$o_4, k = 5$	<b>0.2400</b>
average	$o_4^4$	$o_4, k = 5$	<b>0.7333</b>
single	pairwise	$o_4, k = 5$	0.3077

single	$o_4^4$	$o_4, k = 5$	0.7533
complete	pairwise	$o_4, k = 10$	0.0678
complete	$o_4^4$	$o_4, k = 10$	0.5275
average	pairwise	$o_4, k = 10$	0.1700
average	$o_4^4$	$o_4, k = 10$	0.6600
single	pairwise	$o_4, k = 10$	0.3077
single	$o_4^4$	$o_4, k = 10$	0.6900