

Supplementary materials for the paper entitled ”Comparing the preservation of network properties by graph embeddings”

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This document presents the supplementary materials for the paper ”Comparing the preservation of network properties by graph embeddings”.

1 Annexes

1.1 Neighbors Similarity

Dimensions	2	10	100	995	Dimensions	2	10	100	995
LE	0.058	0.092	0.27	0.008	LE	0.038	0.244	0.845	0.045
LLE	0.148	0.241	0.436	0.113	LLE	0.012	0.027	0.097	0.04
HOPE	0.018	0.044	0.029	0.001	HOPE	0.012	0.065	0.12	0.005
s2v	0.01	0.008	0.006	0.007	s2v	0.013	0.011	0.012	0.011
n2vA	0.009	0.01	0.007	0.007	n2vA	0.02	0.153	0.872	0.911
n2vB	0.007	0.01	0.008	0.007	n2vB	0.018	0.146	0.753	0.775
sdne	0.024	0.039	0.028	0.023	sdne	0.01	0.009	0.012	0.01
svd	0.033	0.047	0.019	0.009	svd	0.014	0.012	0.007	0.004
verse	0.008	0.009	0.009	0.006	verse	0.015	0.223	0.947	0.684
mds	0.009	0.009	0.012	0.014	mds	0.085	0.201	0.901	1.0

(a) Dancer_1k

(b) Gnp1000

Table 1: Neighbors Similarity for Dancer_1k and Gnp1000 Graphs. *Italic*: Best in row. **Bold**: best.

Dimensions	2	10	100	995
LE	0.048	0.18	<i>0.524</i>	0.069
LLE	-	-	0.099	<i>0.104</i>
HOPE	0.025	0.038	<i>0.048</i>	0.019
s2v	0.019	<i>0.024</i>	0.023	0.023
n2vA	0.028	0.086	0.328	<i>0.334</i>
n2vB	0.028	0.075	0.167	<i>0.179</i>
sdne	<i>0.076</i>	<i>0.076</i>	0.065	0.063
svd	<i>0.022</i>	0.015	0.012	0.008
verse	0.031	0.178	<i>0.795</i>	0.428
mds	0.065	0.179	0.799	0.958

(a) BA1000

Dimensions	2	10	100	1000
LE	0.049	0.115	0.18	<i>0.339</i>
LLE	-	-	0.403	0.469
HOPE	0.033	0.093	0.133	<i>0.15</i>
s2v	0.001	0.002	<i>0.002</i>	0.0
n2vA	0.001	0.008	<i>0.016</i>	0.013
n2vB	0.0	0.008	<i>0.01</i>	0.01
sdne	0.038	0.124	<i>0.152</i>	0.144
svd	0.085	0.108	0.144	<i>0.157</i>
verse	0.0	<i>0.009</i>	0.007	0.004

(b) PGP

Table 2: Neighbors Similarity for BA1000 and PGP Graphs. *Italic*: Best in row. **Bold**: best.

Dimensions	2	10	100	1000
LE	0.006	0.057	0.37	<i>0.46</i>
LLE	-	-	0.028	<i>0.038</i>
HOPE	0.002	0.003	0.012	<i>0.029</i>
s2v	0.002	0.003	<i>0.003</i>	0.002
n2vA	0.004	0.016	0.475	<i>0.526</i>
n2vB	0.004	0.011	<i>0.325</i>	0.244
sdne	<i>0.008</i>	0.003	0.002	0.001
svd	0.002	<i>0.002</i>	0.002	0.001
verse	0.004	0.034	0.678	0.571

(a) BA10k

Dimensions	2	10	100	1000
LE	0.048	0.054	0.115	<i>0.302</i>
LLE	0.126	0.123	0.209	0.335
HOPE	0.022	0.052	<i>0.088</i>	0.087
s2v	0.004	0.004	<i>0.004</i>	0.003
n2vA	0.003	<i>0.004</i>	0.003	0.003
n2vB	<i>0.004</i>	0.004	0.004	0.003
sdne	0.046	<i>0.051</i>	0.043	0.033
svd	0.049	<i>0.054</i>	0.037	0.006
verse	<i>0.004</i>	0.004	0.004	0.004

(b) Dancer_10k

Table 3: Neighbors Similarity for BA10k and Dancer_10k Graphs. *Italic*: Best in row. **Bold**: best.

1.2 Structural equivalence

Dimensions	2	10	100	1128	Dimensions	2	10	100	995
LE	<i>0.407</i>	0.224	-0.046	0.052	LE	0.002	-0.011	<i>0.025</i>	0.022
LLE	0.062	-0.114	<i>-0.403</i>	-0.06	LLE	-0.204	-0.375	<i>-0.806</i>	-0.386
HOPE	0.662	0.785	0.957	<i>0.972</i>	HOPE	0.175	0.569	0.885	<i>0.991</i>
s2v	-0.095	0.223	<i>0.354</i>	0.342	s2v	0.102	<i>0.249</i>	0.217	0.212
n2vA	-0.083	-0.051	<i>0.309</i>	0.249	n2vA	-0.033	<i>0.232</i>	-0.214	-0.206
n2vB	-0.061	-0.203	<i>0.238</i>	0.125	n2vB	-0.2	-0.178	-0.112	-0.086
sdne	0.389	-0.135	-0.132	<i>0.6</i>	sdne	nan	0.117	-0.024	0.236
svd	0.718	0.846	0.977	1.0	svd	0.385	0.681	0.935	1.0
verse	-0.02	0.264	<i>0.361</i>	0.337	verse	-0.306	<i>-0.389</i>	0.001	0.238
mds	<i>-0.291</i>	-0.026	-0.117	-0.203	mds	<i>-0.226</i>	-0.012	-0.034	-0.075

(a) email

(b) Gnp1000

Table 4: Structural equivalence for email and Gnp1000 Graphs. *Italic*: Best in row. **Bold**: best.

Dimensions	2	10	100	995	Dimensions	2	10	100	1000
LE	0.043	0.071	0.131	<i>-0.134</i>	LE	0.396	<i>0.756</i>	-0.099	0.074
LLE	-	-	<i>-0.761</i>	-0.564	LLE	0.15	0.145	-0.272	<i>-0.515</i>
HOPE	0.856	0.861	0.958	<i>0.973</i>	HOPE	0.188	0.461	0.889	<i>0.97</i>
s2v	0.073	0.184	<i>0.374</i>	0.366	s2v	0.017	<i>0.034</i>	0.009	0.019
n2vA	<i>0.58</i>	0.09	-0.13	-0.083	n2vA	-0.012	-0.014	0.018	<i>0.026</i>
n2vB	<i>0.51</i>	-0.257	-0.185	-0.16	n2vB	-0.009	<i>-0.039</i>	0.006	0.001
sdne	nan	0.006	-0.298	0.23	sdne	0.424	0.716	0.813	<i>0.93</i>
svd	0.854	0.87	0.98	1.0	svd	0.24	0.842	0.93	0.979
verse	-0.061	-0.447	-0.202	<i>0.608</i>	verse	-0.001	0.002	-0.018	<i>-0.023</i>
mds	-0.274	-0.13	-0.365	<i>-0.546</i>					

(a) BA1000

(b) Dancer_10k

Table 5: Structural equivalence for BA1000 and Dancer_10k Graphs. *Italic*: Best in row. **Bold**: best.

Dimensions	2	10	100	1000	Dimensions	2	10	100	1000
LE	<i>0.191</i>	0.125	0.173	-0.001	LE	-0.023	-0.024	-0.052	-0.038
LLE	-	-	-0.066	-0.305	LLE	-	-	-0.775	-0.926
HOPE	0.49	0.651	0.852	0.922	HOPE	0.236	0.507	0.761	0.917
s2v	0.054	<i>0.056</i>	0.037	0.033	s2v	0.06	<i>0.188</i>	0.148	0.131
n2vA	-0.017	<i>0.051</i>	0.029	0.027	n2vA	-0.008	0.221	-0.059	0.329
n2vB	0.019	0.02	0.026	<i>0.027</i>	n2vB	-0.126	-0.126	0.007	<i>0.484</i>
sdne	0.624	0.806	0.856	0.928	sdne	nan	nan	0.873	0.965
svd	0.551	0.77	0.897	0.976	svd	0.372	0.688	0.851	0.95
verse	<i>0.024</i>	-0.021	0.022	0.016	verse	-0.331	-0.409	-0.202	0.338

(a) PGP
(b) Gnp10000

Table 6: Structural equivalence for PGP and Gnp10000 Graphs. *Italic*: Best in row. **Bold**: best.

1.3 Isomorphic equivalence

Dimensions	2	10	100	1128	Dimensions	2	10	100	995
LE	0.268	0.193	-0.12	-0.04	LE	0.096	-0.038	-0.102	0.074
LLE	0.03	-0.008	-0.318	0.076	LLE	-0.009	-0.007	-0.233	-0.049
HOPE	0.354	0.389	0.548	0.641	HOPE	0.167	0.182	0.163	0.203
s2v	0.214	0.54	0.577	0.566	s2v	0.409	0.689	0.768	0.764
n2vA	0.217	0.256	0.211	0.133	n2vA	0.525	0.205	0.248	0.146
n2vB	0.252	0.061	0.107	0.028	n2vB	0.602	0.081	0.108	0.05
sdne	0.144	0.062	-0.043	0.495	sdne	nan	0.108	0.006	0.193
svd	0.339	0.435	0.549	0.598	svd	0.173	0.156	0.179	0.177
verse	0.233	0.571	0.567	0.557	verse	0.034	-0.167	-0.041	0.437
mds	-0.172	-0.004	-0.041	-0.086	mds	-0.206	-0.023	-0.062	-0.137

(a) email
(b) Dancer_1k

Table 7: Isomorphic equivalence for email and Dancer_1k Graphs. *Italic*: Best in row. **Bold**: best.

Dimensions	2	10	100	995	Dimensions	2	10	100	1000
LE	0.07	0.036	-0.012	0.114	LE	0.02	0.04	0.058	0.087
LLE	-	-	-0.414	-0.104	LLE	-	-	-0.384	-0.449
HOPE	0.242	0.256	0.333	0.441	HOPE	0.218	0.225	0.257	0.314
s2v	0.253	0.537	0.614	0.619	s2v	0.301	0.755	0.721	0.675
n2vA	0.342	0.078	0.053	0.048	n2vA	0.331	0.089	-0.055	0.214
n2vB	0.24	-0.067	0.065	0.093	n2vB	0.357	-0.072	0.016	0.284
sdne	nan	nan	-0.205	0.154	sdne	0.107	0.201	0.328	0.431
svd	0.214	0.245	0.347	0.386	svd	0.217	0.218	0.251	0.344
verse	-0.106	-0.251	-0.117	0.16	verse	-0.148	-0.208	-0.079	0.155
mds	-0.189	-0.027	-0.112	-0.173					

(a) BA1000
(b) BA10k

Table 8: Isomorphic equivalence for BA1000 and BA10k Graphs. *Italic*: Best in row. **Bold**: best.

Dimensions	2	10	100	1000	Dimensions	2	10	100	1000
LE	-0.097	-0.081	<i>-0.17</i>	0.031	LE	-0.028	0.006	<i>0.093</i>	0.059
LLE	-	-	<i>-0.213</i>	-0.015	LLE	-	-	-0.015	<i>0.05</i>
HOPE	-0.003	0.041	<i>0.07</i>	0.061	HOPE	<i>0.665</i>	0.15	0.22	0.204
s2v	0.108	0.215	0.274	0.268	s2v	0.349	0.774	0.688	0.636
n2vA	0.014	<i>0.125</i>	-0.023	0.013	n2vA	0.133	0.043	-0.096	<i>-0.147</i>
n2vB	<i>0.074</i>	0.012	-0.018	0.016	n2vB	<i>0.273</i>	0.024	-0.058	-0.098
sdne	<i>0.134</i>	0.027	0.043	0.032	sdne	nan	nan	0.095	<i>0.101</i>
svd	-0.003	<i>0.141</i>	0.075	0.078	svd	<i>0.34</i>	0.202	0.212	0.177
verse	<i>-0.032</i>	0.009	-0.005	-0.014	verse	<i>0.055</i>	0.021	0.033	0.05

(a) PGP
(b) Gnp10000

Table 9: Isomorphic equivalence for PGP and Gnp10000 Graphs. *Italic*: Best in row. **Bold**: best.