

Table 1: Node classification results over homophilous graphs (%). * indicates our implementation of GTs and classic GNNs, while GTs are tuned using the same hyperparameter search space and training environments as the classic GNNs. The top 1st, 2nd and 3rd results are highlighted.

Metric	Cora Accuracy $\uparrow$	CiteSeer Accuracy $\uparrow$	PubMed Accuracy $\uparrow$	Computer Accuracy $\uparrow$	Photo Accuracy $\uparrow$	CS Accuracy $\uparrow$	Physics Accuracy $\uparrow$	WikiCS Accuracy $\uparrow$
GraphGPS	82.84 $\pm$ 1.03	72.73 $\pm$ 1.23	79.94 $\pm$ 0.26	91.19 $\pm$ 0.54	95.06 $\pm$ 0.13	93.93 $\pm$ 0.12	97.12 $\pm$ 0.19	78.66 $\pm$ 0.49
GraphGPS*	83.87 $\pm$ 0.96	72.73 $\pm$ 1.23	79.94 $\pm$ 0.26	91.79 $\pm$ 0.63	94.89 $\pm$ 0.14	94.04 $\pm$ 0.21	96.71 $\pm$ 0.15	78.66 $\pm$ 0.49
NodeFormer	82.20 $\pm$ 0.90	72.50 $\pm$ 1.10	79.90 $\pm$ 1.00	86.98 $\pm$ 0.62	93.46 $\pm$ 0.35	95.64 $\pm$ 0.22	96.45 $\pm$ 0.28	74.73 $\pm$ 0.94
NodeFormer*	82.73 $\pm$ 0.75	72.37 $\pm$ 1.20	79.59 $\pm$ 0.92	87.29 $\pm$ 0.58	93.43 $\pm$ 0.56	95.69 $\pm$ 0.27	96.48 $\pm$ 0.34	75.13 $\pm$ 0.93
SGFormer	84.50 $\pm$ 0.80	72.60 $\pm$ 0.20	80.30 $\pm$ 0.60	91.99 $\pm$ 0.76	95.10 $\pm$ 0.47	94.78 $\pm$ 0.20	96.60 $\pm$ 0.18	73.46 $\pm$ 0.56
SGFormer*	84.82 $\pm$ 0.85	72.72 $\pm$ 1.15	80.60 $\pm$ 0.49	92.42 $\pm$ 0.66	95.58 $\pm$ 0.36	95.71 $\pm$ 0.24	96.75 $\pm$ 0.26	80.05 $\pm$ 0.46
Polynormer	83.25 $\pm$ 0.93	72.31 $\pm$ 0.78	79.24 $\pm$ 0.43	93.68 $\pm$ 0.21	96.46 $\pm$ 0.26	95.53 $\pm$ 0.16	97.27 $\pm$ 0.08	80.10 $\pm$ 0.67
Polynormer*	83.43 $\pm$ 0.89	72.19 $\pm$ 0.83	79.35 $\pm$ 0.73	93.78 $\pm$ 0.10	96.57 $\pm$ 0.23	95.42 $\pm$ 0.19	97.18 $\pm$ 0.11	80.26 $\pm$ 0.92
GCN	81.60 $\pm$ 0.40	71.60 $\pm$ 0.40	78.80 $\pm$ 0.60	89.65 $\pm$ 0.52	92.70 $\pm$ 0.20	92.92 $\pm$ 0.12	96.18 $\pm$ 0.07	77.47 $\pm$ 0.85
GCN*	85.08 $\pm$ 0.52	3.48 $\uparrow$	72.98 $\pm$ 0.84	1.38 $\uparrow$	81.32 $\pm$ 0.72	2.52 $\uparrow$	93.80 $\pm$ 0.29	4.15 $\uparrow$
GraphSAGE	82.68 $\pm$ 0.47	71.93 $\pm$ 0.85	79.41 $\pm$ 0.53	91.20 $\pm$ 0.29	94.59 $\pm$ 0.14	93.91 $\pm$ 0.13	96.49 $\pm$ 0.06	74.77 $\pm$ 0.95
GraphSAGE*	84.18 $\pm$ 0.81	1.50 $\uparrow$	71.93 $\pm$ 0.85	0.00 $\uparrow$	79.41 $\pm$ 0.53	0.00 $\uparrow$	93.59 $\pm$ 0.22	2.39 $\uparrow$
GAT	83.00 $\pm$ 0.70	72.10 $\pm$ 1.10	79.00 $\pm$ 0.40	90.78 $\pm$ 0.13	93.87 $\pm$ 0.11	93.61 $\pm$ 0.14	96.17 $\pm$ 0.08	76.91 $\pm$ 0.82
GAT*	84.64 $\pm$ 1.27	1.64 $\uparrow$	72.10 $\pm$ 1.10	0.00 $\uparrow$	79.70 $\pm$ 0.70	0.70 $\uparrow$	93.93 $\pm$ 0.16	3.15 $\uparrow$

Table 2: Node classification results on heterophilous graphs (%).

	Squirrel	Chameleon	Amazon-Ratings	Roman-Empire	Minesweeper	Questions
GraphGPS	39.67 $\pm$ 2.84	40.79 $\pm$ 4.03	53.10 $\pm$ 0.42	82.00 $\pm$ 0.61	90.63 $\pm$ 0.67	71.73 $\pm$ 1.47
GraphGPS*	39.81 $\pm$ 2.28	41.55 $\pm$ 3.91	53.27 $\pm$ 0.66	82.72 $\pm$ 0.68	90.75 $\pm$ 0.89	72.56 $\pm$ 1.33
NodeFormer	38.52 $\pm$ 1.57	34.73 $\pm$ 4.14	43.86 $\pm$ 0.35	64.49 $\pm$ 0.73	86.71 $\pm$ 0.88	74.27 $\pm$ 1.46
NodeFormer*	38.89 $\pm$ 2.67	36.38 $\pm$ 3.85	43.79 $\pm$ 0.57	74.83 $\pm$ 0.81	87.71 $\pm$ 0.69	75.02 $\pm$ 1.61
SGFormer	41.80 $\pm$ 2.27	44.93 $\pm$ 3.91	48.01 $\pm$ 0.49	79.10 $\pm$ 0.32	90.89 $\pm$ 0.58	72.15 $\pm$ 1.31
SGFormer*	42.65 $\pm$ 2.41	45.21 $\pm$ 3.72	54.14 $\pm$ 0.62	80.01 $\pm$ 0.44	91.42 $\pm$ 0.41	73.81 $\pm$ 0.59
Polynormer	40.87 $\pm$ 1.96	41.82 $\pm$ 3.45	54.81 $\pm$ 0.49	92.55 $\pm$ 0.37	97.46 $\pm$ 0.36	78.92 $\pm$ 0.89
Polynormer*	41.97 $\pm$ 2.14	41.97 $\pm$ 3.18	54.96 $\pm$ 0.22	92.66 $\pm$ 0.60	97.49 $\pm$ 0.48	78.94 $\pm$ 0.78
GCN	38.67 $\pm$ 1.84	41.31 $\pm$ 3.05	48.70 $\pm$ 0.63	73.69 $\pm$ 0.74	89.75 $\pm$ 0.52	76.09 $\pm$ 1.27
GCN*	44.50 $\pm$ 1.92	5.83 $\uparrow$	46.11 $\pm$ 3.16	4.80 $\uparrow$	53.57 $\pm$ 0.32	4.87 $\uparrow$
GraphSAGE	36.09 $\pm$ 1.99	37.77 $\pm$ 4.14	53.63 $\pm$ 0.39	85.74 $\pm$ 0.67	93.51 $\pm$ 0.57	76.44 $\pm$ 0.62
GraphSAGE*	39.93 $\pm$ 1.58	3.84 $\uparrow$	43.44 $\pm$ 3.19	5.67 $\uparrow$	54.72 $\pm$ 0.38	1.09 $\uparrow$
GAT	35.62 $\pm$ 2.06	39.21 $\pm$ 3.08	52.70 $\pm$ 0.62	88.75 $\pm$ 0.41	93.91 $\pm$ 0.35	76.79 $\pm$ 0.71
GAT*	38.72 $\pm$ 1.46	3.10 $\uparrow$	43.44 $\pm$ 3.00	4.23 $\uparrow$	54.99 $\pm$ 0.71	2.29 $\uparrow$

Table 3: Node classification results on large-scale graphs (%).

	ogbn-proteins	ogbn-arxiv	ogbn-products	pokec
Metric	ROC-AUC $\uparrow$	Accuracy $\uparrow$	Accuracy $\uparrow$	Accuracy $\uparrow$
GraphGPS	76.83 $\pm$ 0.26	70.97 $\pm$ 0.41	OOM	OOM
GraphGPS*	77.15 $\pm$ 0.64	71.23 $\pm$ 0.59	OOM	OOM
NodeFormer	77.45 $\pm$ 1.15	59.90 $\pm$ 0.42	72.93 $\pm$ 0.13	71.00 $\pm$ 1.30
NodeFormer*	77.86 $\pm$ 0.84	67.78 $\pm$ 0.28	73.96 $\pm$ 0.30	71.00 $\pm$ 1.30
SGFormer	79.53 $\pm$ 0.38	72.63 $\pm$ 0.13	74.16 $\pm$ 0.31	73.76 $\pm$ 0.24
SGFormer*	79.92 $\pm$ 0.48	72.76 $\pm$ 0.33	81.54 $\pm$ 0.43	82.44 $\pm$ 0.76
Polynormer	78.97 $\pm$ 0.47	73.46 $\pm$ 0.16	83.82 $\pm$ 0.11	86.10 $\pm$ 0.05
Polynormer*	79.53 $\pm$ 0.67	73.40 $\pm$ 0.22	83.82 $\pm$ 0.11	86.06 $\pm$ 0.25
GCN	72.51 $\pm$ 0.35	71.74 $\pm$ 0.29	75.64 $\pm$ 0.21	75.45 $\pm$ 0.17
GCN*	77.29 $\pm$ 0.46	4.78 $\uparrow$	73.60 $\pm$ 0.18	1.86 $\uparrow$
GraphSAGE	77.68 $\pm$ 0.20	71.49 $\pm$ 0.27	78.29 $\pm$ 0.16	75.63 $\pm$ 0.38
GraphSAGE*	82.21 $\pm$ 0.32	4.53 $\uparrow$	72.95 $\pm$ 0.31	1.46 $\uparrow$
GAT	72.02 $\pm$ 0.44	71.95 $\pm$ 0.36	79.45 $\pm$ 0.59	72.23 $\pm$ 0.18
GAT*	85.01 $\pm$ 0.46	12.99 $\uparrow$	73.30 $\pm$ 0.16	1.35 $\uparrow$