tide test53-dayroute

Lucy Score = Throughput x Availability x Acc / 10,000. LPD condenses live-fit vs Acc-champ RAM.
[T]=Tween [S]=Split [FP]=FastProxy [L]=Linear [HP]=HeadProxy
done - epoch 1 - lr 0.02 - 2026-08-26 23:28:49 - 0.0.0.0:8080

This epoch 3944 / 3944 cells. Recorded 3944 results. Learning rate 0.02.
Score 0 usually means the cell finished before a Lucy pulse (Acc never sampled). Score is live-fit: Throughput x Availability x Acc.
SGD that blocks serve dies on Availability. SoftAcc is serve-confidence only.
dayroute - dense x mode x dtype x funny-LR

Lucy champions (this tide)

Axis	Cell	Score	Soft	Acc	Thru	Avail
hard acc	dense|int5|Mesh[T]|lr=2	542.18	42.8	15.8	10151.8	33.7
throughput	dense|float32|[T]Alt|lr=2	3116.71	0.0	24.7	74083.3	17.1
availability	dense|fp6|Mesh[T][S]Sparse|lr=200	1150.62	2.2	21.1	9504.4	57.3
lucy score	dense|float64|Mesh[T]|lr=2k	3968.63	0.0	24.6	49174.4	32.9
mobile score (trap)	dense|binary|Mesh[T]|lr=2k	2730.67	0.0	23.3	26482.3	44.2
acc/sec	dense|complex64|NormalBP|lr=0.02	854.63	34.8	50.0	10725.0	17.1

Lucy axis champions (this tide)

Axis	Mode	DType	Arch	Value
hard_acc	sgd	float64	singlex1	50.00
throughput	[T]Alt	float32	singlex1	74083.30
availability	Mesh[T][S]Sparse	fp6	singlex1	57.34
score	Mesh[T]	float64	singlex1	3968.63
soft_acc	Mesh[T]	int5	singlex1	42.84
acc_thru	[T]Alt	float32	singlex1	18263.42
realtime	Mesh[T]	float32	singlex1	16872.43
adapt	Step[T][S][L]	int2	singlex1	45.98
keep_learn	sgd	complex64	singlex1	25.00
acc_per_sec	sgd	complex64	singlex1	25.00
consistency	sgd	float64	singlex1	100.00
stability	sgd	fp4	singlex1	100.00
mobile_score	Mesh[T]	binary	singlex1	11545634~
lpd	[T][S][HP]	binary	singlex1	1.43
mspeed	Step[T][S]Sparse	int4	singlex1	1.00
mavail	Mesh[T][S]Sparse	uint6	singlex1	1.00
mix	[T][S]Sparse	int4	singlex1	0.92
gold_std	Step[T][S]Sparse	int4	singlex1	0.97

Best settings per train mode

Mode	DType	Format	Score	Soft	Acc	Avail	n
Mesh[T]	float64	none	3968.6	0.0	24.6	32.9	136
Mesh[T][S]Sparse	float64	none	3773.3	0.0	24.8	41.4	136
[T][S]Sparse	float64	none	3282.6	1.8	25.5	30.5	136
Step[T][S]Sparse	complex64	none	3131.2	4.4	27.1	42.9	136
[T]Alt	float32	none	3116.7	0.0	24.7	17.1	136
Mesh[T][S][FP]	float64	none	1986.7	8.0	28.2	24.9	136
[T][S][HP]	float64	none	1983.7	8.4	28.0	25.1	136
Mesh[T]Alt	float32	none	1958.3	0.0	24.8	25.9	136
Mesh[T][S]	float64	none	1788.3	3.9	26.7	24.0	136
[T][S][FP]	float64	none	1788.1	7.9	28.4	23.4	136
Step[T][S][HP]	float64	none	1727.2	7.9	28.6	21.8	136

Step[T][S][FP]	float64	none	1677.5	7.0	27.8	20.7	136
[T][S]	float64	none	1653.7	4.1	27.0	22.9	136
[T][S][HP]Async	float64	none	1640.7	1.7	25.7	22.9	136
Step[T][S]	complex64	none	1638.2	6.2	29.0	29.3	136
Step[T][S][HP]Async	float64	none	1586.9	0.0	24.1	25.8	136
[T][S][L]Cache	int64	none	1449.7	2.5	24.2	28.2	136
Step[T][S][L]Cache	int64	none	1321.8	0.0	24.6	29.4	136
[T][S][L]	int64	none	1307.6	4.5	27.4	26.9	136
Step[T][S][L]	float64	none	1217.3	2.5	26.2	19.4	136
MeshBP	int64	none	1215.4	29.8	0.4	21.6	136
sgd	complex128	none	1002.0	37.5	0.4	21.9	136
step_sgd	complex64	none	949.5	27.2	0.4	22.0	136
step_tween_chain	complex64	none	923.6	25.8	2.0	23.1	136
tween_chain	float64	none	921.6	30.4	50.0	13.8	136
Mesh[T]Chain	fp4	none	866.2	0.0	24.7	20.8	136
step_tween	bfloat16	none	742.6	6.2	25.2	20.3	136
tween	complex64	none	683.7	27.8	0.4	18.7	136
Step[T]Alt	int	none	351.4	28.9	2.0	13.5	136

Best dtype per mode

Mode	Winner dtype	Score	Soft	Acc
Mesh[T]	float64	3968.6	0.0	24.6
Mesh[T][S]Sparse	float64	3773.3	0.0	24.8
[T][S]Sparse	float64	3282.6	1.8	25.5
Step[T][S]Sparse	complex64	3131.2	4.4	27.1
[T]Alt	float32	3116.7	0.0	24.7
Mesh[T][S][FP]	float64	1986.7	8.0	28.2
[T][S][HP]	float64	1983.7	8.4	28.0
Mesh[T]Alt	float32	1958.3	0.0	24.8
Mesh[T][S]	float64	1788.3	3.9	26.7
[T][S][FP]	float64	1788.1	7.9	28.4
Step[T][S][HP]	float64	1727.2	7.9	28.6
Step[T][S][FP]	float64	1677.5	7.0	27.8
[T][S]	float64	1653.7	4.1	27.0
[T][S][HP]Async	float64	1640.7	1.7	25.7
Step[T][S]	complex64	1638.2	6.2	29.0
Step[T][S][HP]Async	float64	1586.9	0.0	24.1
[T][S][L]Cache	int64	1449.7	2.5	24.2
Step[T][S][L]Cache	int64	1321.8	0.0	24.6
[T][S][L]	int64	1307.6	4.5	27.4
Step[T][S][L]	float64	1217.3	2.5	26.2
MeshBP	int64	1215.4	29.8	0.4
sgd	complex128	1002.0	37.5	0.4
step_sgd	complex64	949.5	27.2	0.4
step_tween_chain	complex64	923.6	25.8	2.0
tween_chain	float64	921.6	30.4	50.0
Mesh[T]Chain	fp4	866.2	0.0	24.7
step_tween	bfloat16	742.6	6.2	25.2
tween	complex64	683.7	27.8	0.4
Step[T]Alt	int	351.4	28.9	2.0

Best mode per dtype

DType	Winner mode	Score	Soft	Acc
float64	Mesh[T]	3968.6	0.0	24.6
float32	Mesh[T]	3960.8	0.0	23.5
int2	Mesh[T]	3613.6	0.0	24.1
int4	Mesh[T]	3401.3	0.1	24.4
fp4	Mesh[T]	3269.5	0.0	24.6
complex64	Step[T][S]Sparse	3131.2	4.4	27.1
int64	Mesh[T]	3079.7	0.0	24.7
uint64	Mesh[T]	3042.4	0.0	24.7
ternary	Mesh[T]	2960.7	0.0	24.1
complex128	[T][S]Sparse	2837.9	6.6	26.3
bfloat16	Mesh[T]	2821.2	0.0	24.1
uint32	Mesh[T]	2806.6	0.0	24.7
int16	Mesh[T][S]Sparse	2785.1	20.1	24.0
uint2	Mesh[T]	2773.2	0.0	23.5
uint8	Mesh[T][S]Sparse	2741.2	20.8	22.6
binary	Mesh[T]	2730.7	0.0	23.3
int32	[T][S]Sparse	2703.2	20.3	24.0
int8	Mesh[T][S]Sparse	2665.4	24.0	0.4
float16	Mesh[T]	2639.6	0.0	24.7
int	Mesh[T][S]Sparse	2521.5	5.5	26.6
uint16	[T][S]Sparse	2516.5	20.4	24.5
uint4	Mesh[T][S]Sparse	2489.8	7.0	23.8
fp8e5m2	Mesh[T]	2402.3	6.5	26.0
uint	[T][S]Sparse	2356.2	20.5	21.1
uint3	Mesh[T]	2273.2	0.0	24.6
uintptr	[T][S]Sparse	2225.0	20.6	24.8
nf4	Mesh[T]	2225.0	0.0	24.4
int3	Mesh[T]	2210.1	0.0	26.0
uint5	Mesh[T]	2009.0	0.0	24.1
fp8e4m3	Mesh[T][S]Sparse	1925.0	4.1	23.4
uint6	Mesh[T]	1464.7	3.2	23.9
int5	Mesh[T]	1419.0	0.0	23.2
int6	Mesh[T]	1408.1	3.1	24.0
fp6	Mesh[T]	1220.5	1.1	22.8

Leaderboard (Lucy Score)

#	Cell	Score	Soft	Acc	Thru	Avail
1	dense|float64|Mesh[T]|lr=2k	3968.6	0.0	24.6	49174.4	32.9
2	dense|float32|Mesh[T]|lr=2k	3960.8	0.0	23.5	53034.4	31.8
3	dense|float64|Mesh[T][S]Sparse|lr=2k	3773.3	0.0	24.8	36740.4	41.4
4	dense|int2|Mesh[T]|lr=2k	3613.6	0.0	24.1	29135.8	51.4
5	dense|int4|Mesh[T]|lr=2	3401.3	0.1	24.4	35907.0	38.7
6	dense|float64|[T][S]Sparse|lr=0.02	3282.6	1.8	25.5	42091.8	30.5
7	dense|fp4|Mesh[T]|lr=0.02	3269.5	0.0	24.6	35706.4	37.2
8	dense|complex64|Step[T][S]Sparse|lr=0.02	3131.2	4.4	27.1	26904.8	42.9
9	dense|float64|Mesh[T]|lr=200	3127.5	0.7	22.0	43300.4	32.8
10	dense|int2|Mesh[T]|lr=200	3121.4	0.0	24.7	30744.5	41.0
11	dense|float32|[T]Alt|lr=2	3116.7	0.0	24.7	74083.3	17.1
12	dense|float64|Mesh[T][S]Sparse|lr=0.02	3101.4	2.6	25.6	40491.3	29.9
13	dense|int64|Mesh[T]|lr=2k	3079.7	0.0	24.7	29460.9	42.3
14	dense|float64|Mesh[T][S]Sparse|lr=2	3066.3	0.0	24.5	38627.8	32.4

15	dense|int2|Mesh[T]|lr=2	3048.2	0.2	24.4	35733.5	35.0
16	dense|uint64|Mesh[T]|lr=2k	3042.4	0.0	24.7	28523.0	43.2
17	dense|ternary|Mesh[T]|lr=200	2960.7	0.0	24.1	26679.5	46.0
18	dense|complex64|Mesh[T][S]Sparse|lr=0.02	2927.4	5.9	26.2	27921.8	40.0
19	dense|float32|Mesh[T][S]Sparse|lr=0.02	2926.5	3.2	26.2	41561.3	26.8
20	dense|fp4|Mesh[T]|lr=2	2921.5	0.0	24.6	38108.2	31.1

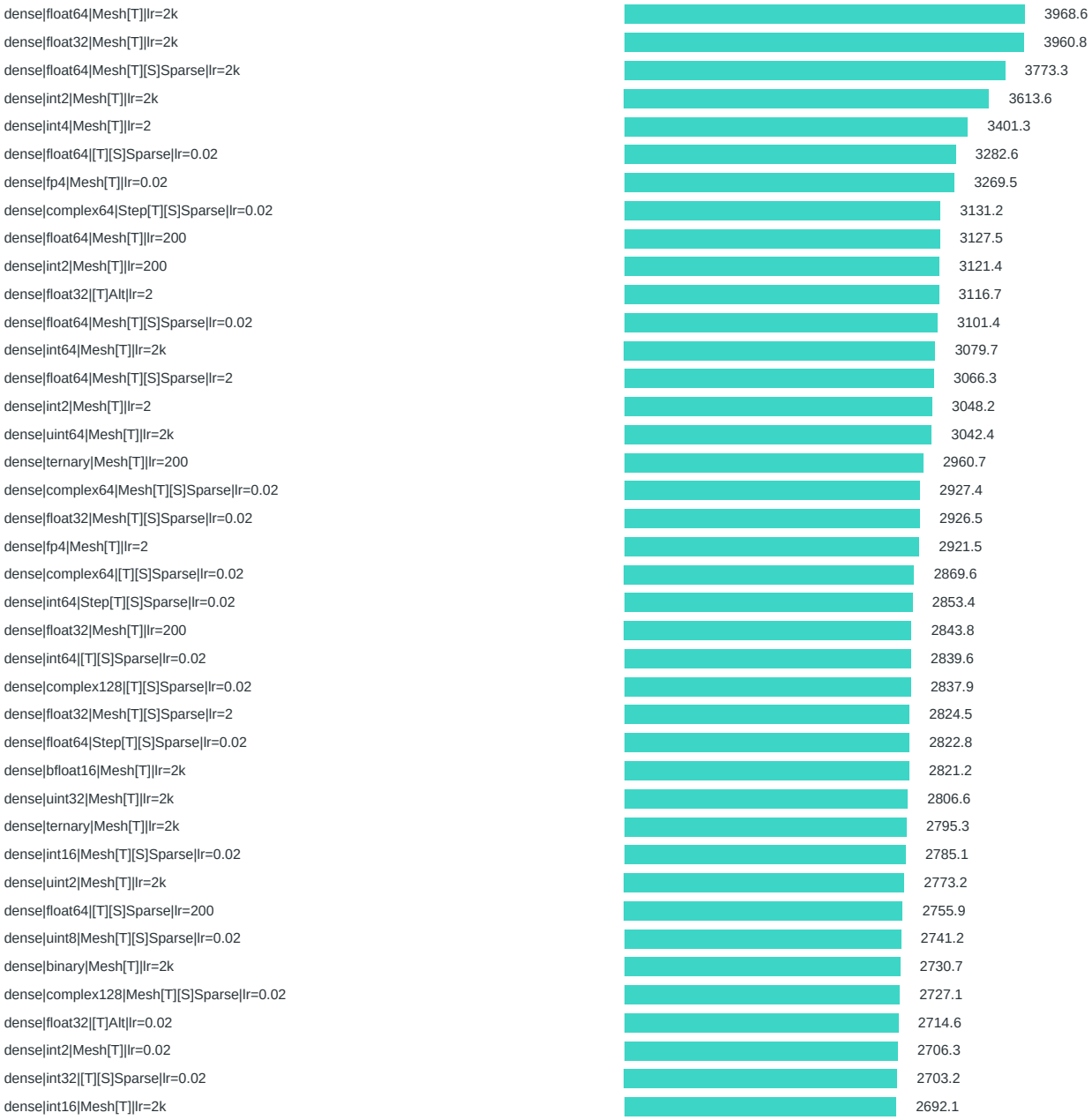
Leaderboard (SoftAcc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	dense|uint8|Mesh[T][S]Sparse|lr=0.02	2741.2	20.8	22.6	29395.9	41.2
2	dense|int32|[T][S]Sparse|lr=0.02	2703.2	20.3	24.0	27197.3	41.4
3	dense|int16|Mesh[T][S]Sparse|lr=0.02	2785.1	20.1	24.0	29853.8	38.8
4	dense|float32|[T]Alt|lr=0.02	2714.6	6.8	28.4	63050.3	15.1
5	dense|complex128|[T][S]Sparse|lr=0.02	2837.9	6.6	26.3	26821.6	40.2
6	dense|complex64|Mesh[T][S]Sparse|lr=0.02	2927.4	5.9	26.2	27921.8	40.0
7	dense|complex64|[T][S]Sparse|lr=0.02	2869.6	5.6	26.2	28180.9	38.8
8	dense|complex128|Mesh[T][S]Sparse|lr=0.02	2727.1	5.3	26.7	27310.8	37.4
9	dense|int64|[T][S]Sparse|lr=0.02	2839.6	4.4	26.5	29853.8	35.9
10	dense|complex64|Step[T][S]Sparse|lr=0.02	3131.2	4.4	27.1	26904.8	42.9
11	dense|int64|Step[T][S]Sparse|lr=0.02	2853.4	4.1	26.3	29998.6	36.2
12	dense|int2|Mesh[T]|lr=0.02	2706.3	4.1	24.5	30151.3	36.6
13	dense|float64|Step[T][S]Sparse|lr=0.02	2822.8	3.3	25.8	40317.4	27.2
14	dense|float32|Mesh[T][S]Sparse|lr=0.02	2926.5	3.2	26.2	41561.3	26.8
15	dense|float64|Mesh[T][S]Sparse|lr=0.02	3101.4	2.6	25.6	40491.3	29.9
16	dense|float64|[T][S]Sparse|lr=0.02	3282.6	1.8	25.5	42091.8	30.5
17	dense|float32|Mesh[T]|lr=200	2843.8	1.4	23.7	46337.3	25.9
18	dense|float64|Mesh[T]|lr=200	3127.5	0.7	22.0	43300.4	32.8
19	dense|int2|Mesh[T]|lr=2	3048.2	0.2	24.4	35733.5	35.0
20	dense|int4|Mesh[T]|lr=2	3401.3	0.1	24.4	35907.0	38.7

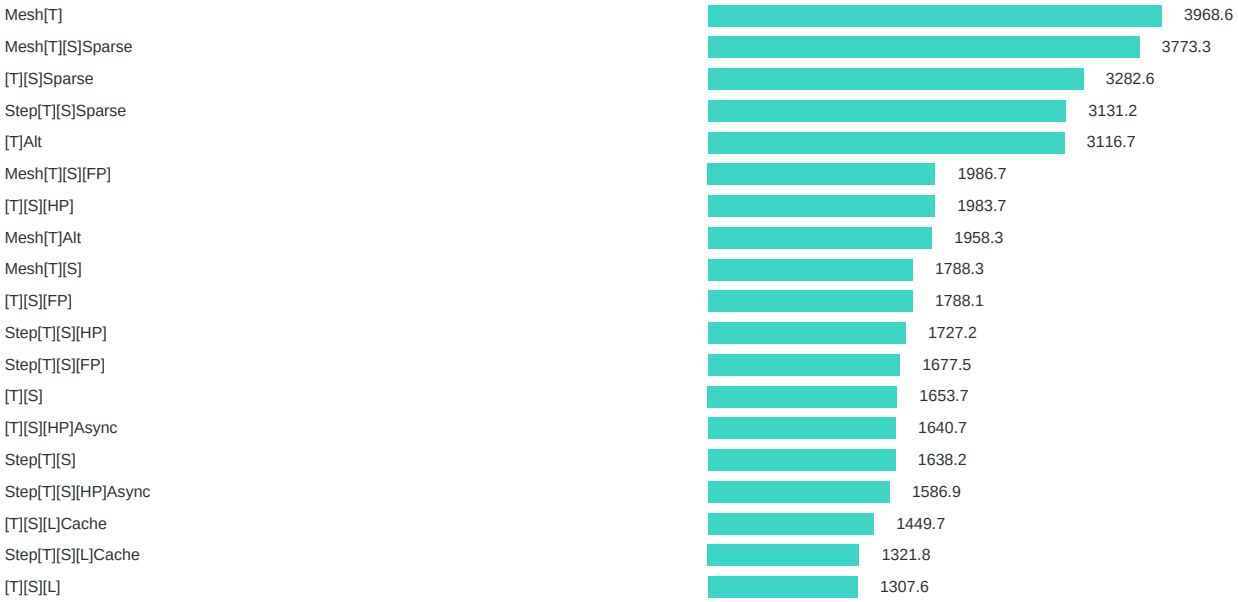
Leaderboard (hard Acc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	dense|float32|[T]Alt|lr=0.02	2714.6	6.8	28.4	63050.3	15.1
2	dense|complex64|Step[T][S]Sparse|lr=0.02	3131.2	4.4	27.1	26904.8	42.9
3	dense|complex128|Mesh[T][S]Sparse|lr=0.02	2727.1	5.3	26.7	27310.8	37.4
4	dense|int64|[T][S]Sparse|lr=0.02	2839.6	4.4	26.5	29853.8	35.9
5	dense|int64|Step[T][S]Sparse|lr=0.02	2853.4	4.1	26.3	29998.6	36.2
6	dense|complex128|[T][S]Sparse|lr=0.02	2837.9	6.6	26.3	26821.6	40.2
7	dense|float32|Mesh[T][S]Sparse|lr=0.02	2926.5	3.2	26.2	41561.3	26.8
8	dense|complex64|Mesh[T][S]Sparse|lr=0.02	2927.4	5.9	26.2	27921.8	40.0
9	dense|complex64|[T][S]Sparse|lr=0.02	2869.6	5.6	26.2	28180.9	38.8
10	dense|ternary|Mesh[T]|lr=2k	2795.3	0.0	25.9	26713.9	40.3
11	dense|float64|Step[T][S]Sparse|lr=0.02	2822.8	3.3	25.8	40317.4	27.2
12	dense|float64|Mesh[T][S]Sparse|lr=0.02	3101.4	2.6	25.6	40491.3	29.9
13	dense|float64|[T][S]Sparse|lr=0.02	3282.6	1.8	25.5	42091.8	30.5
14	dense|float64|Mesh[T][S]Sparse|lr=2k	3773.3	0.0	24.8	36740.4	41.4
15	dense|float32|Mesh[T][S]Sparse|lr=2	2824.5	0.0	24.7	34971.1	32.6
16	dense|int2|Mesh[T]|lr=200	3121.4	0.0	24.7	30744.5	41.0
17	dense|int64|Mesh[T]|lr=2k	3079.7	0.0	24.7	29460.9	42.3
18	dense|uint32|Mesh[T]|lr=2k	2806.6	0.0	24.7	28868.9	39.4
19	dense|uint64|Mesh[T]|lr=2k	3042.4	0.0	24.7	28523.0	43.2
20	dense|float32|[T]Alt|lr=2	3116.7	0.0	24.7	74083.3	17.1

Top scores



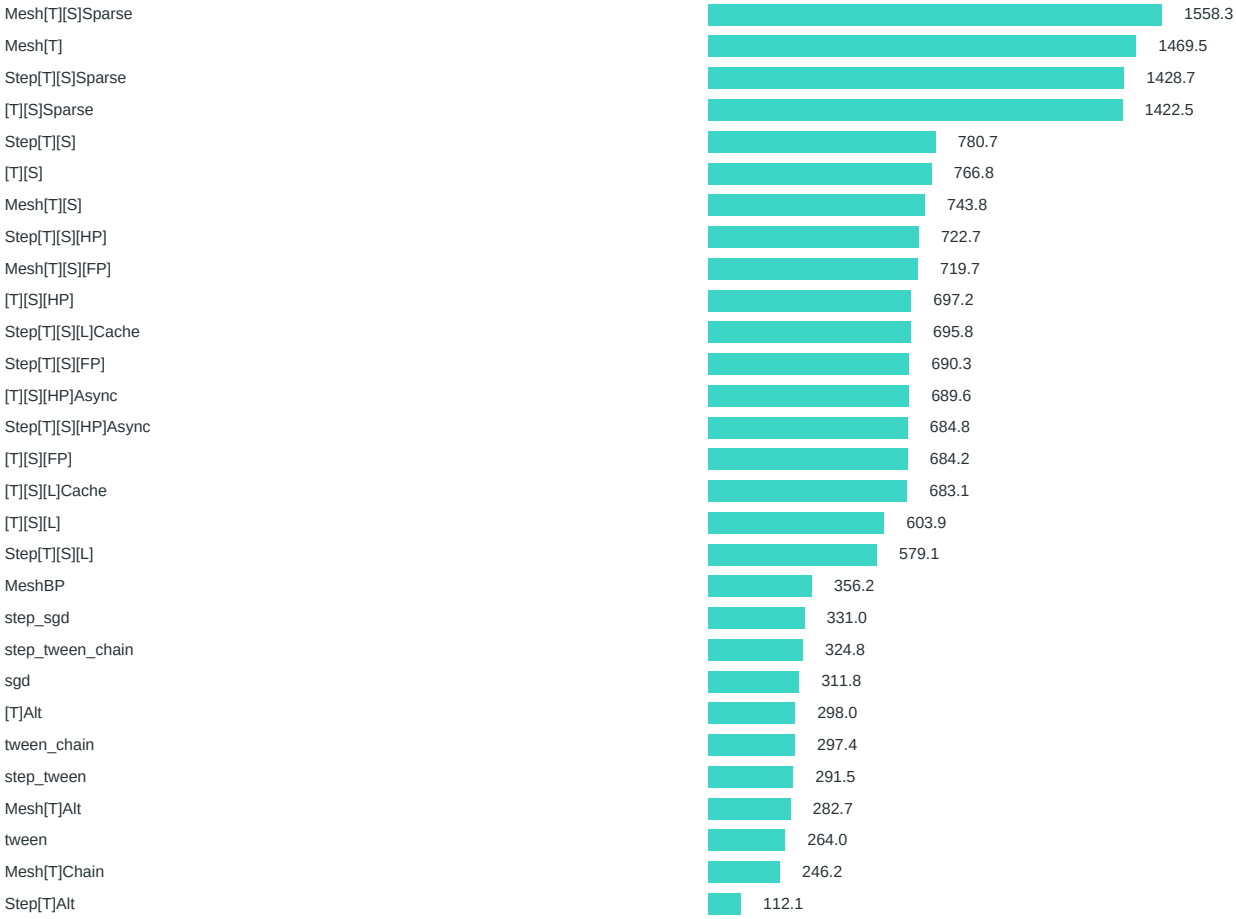
Best settings per mode



Best settings per mode



Mean Score by train mode



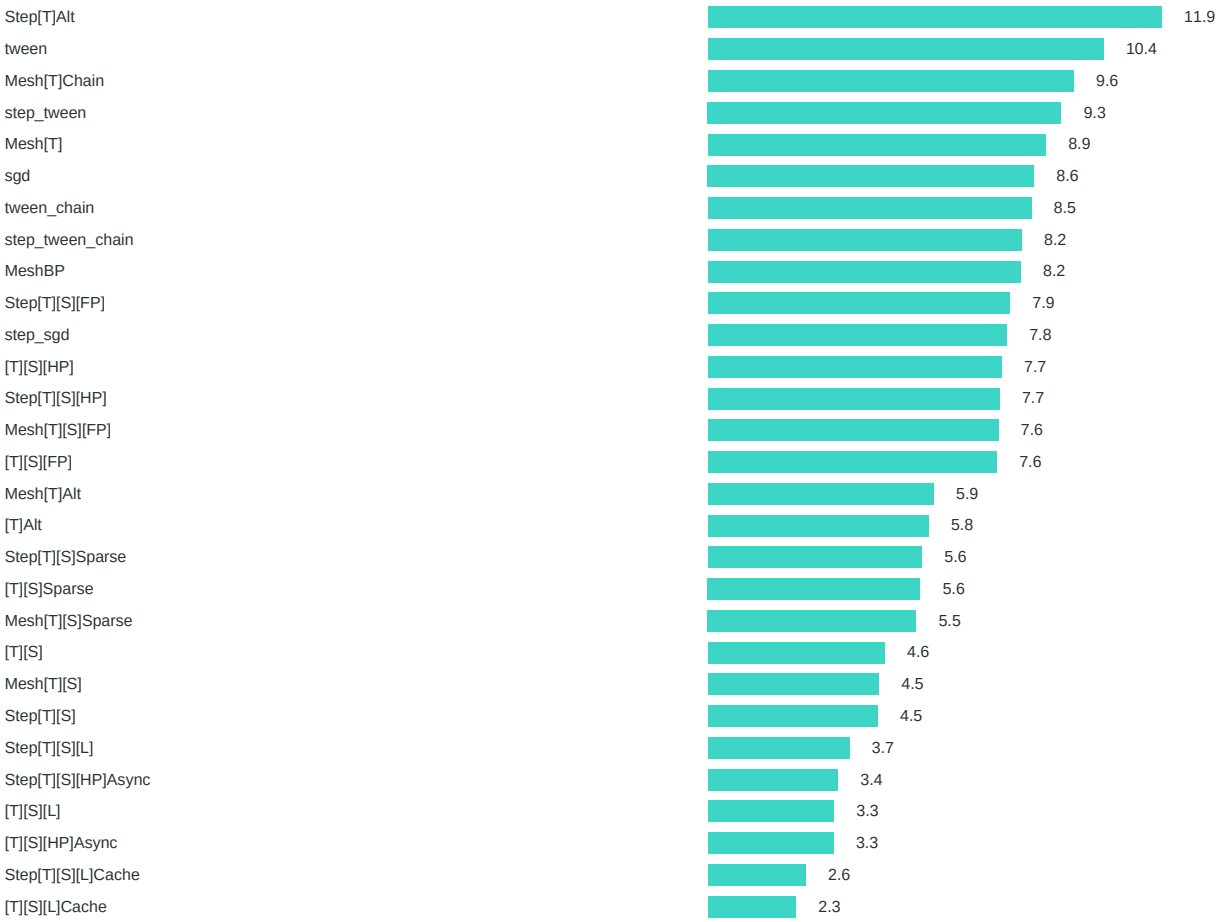
Mean hard Acc by train mode



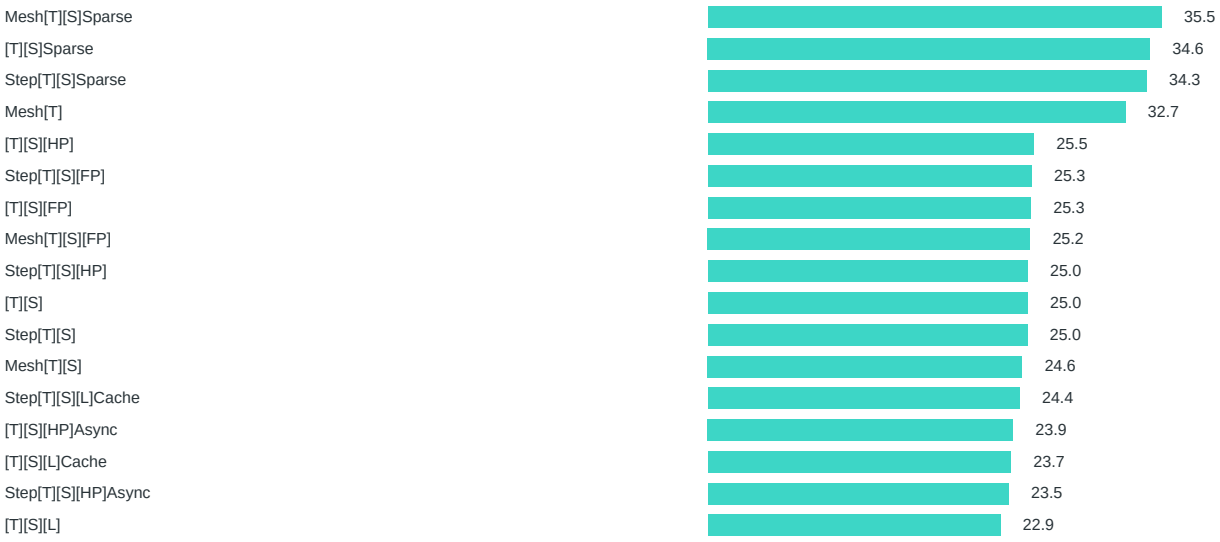
Mean hard Acc by train mode



Mean SoftAcc by train mode



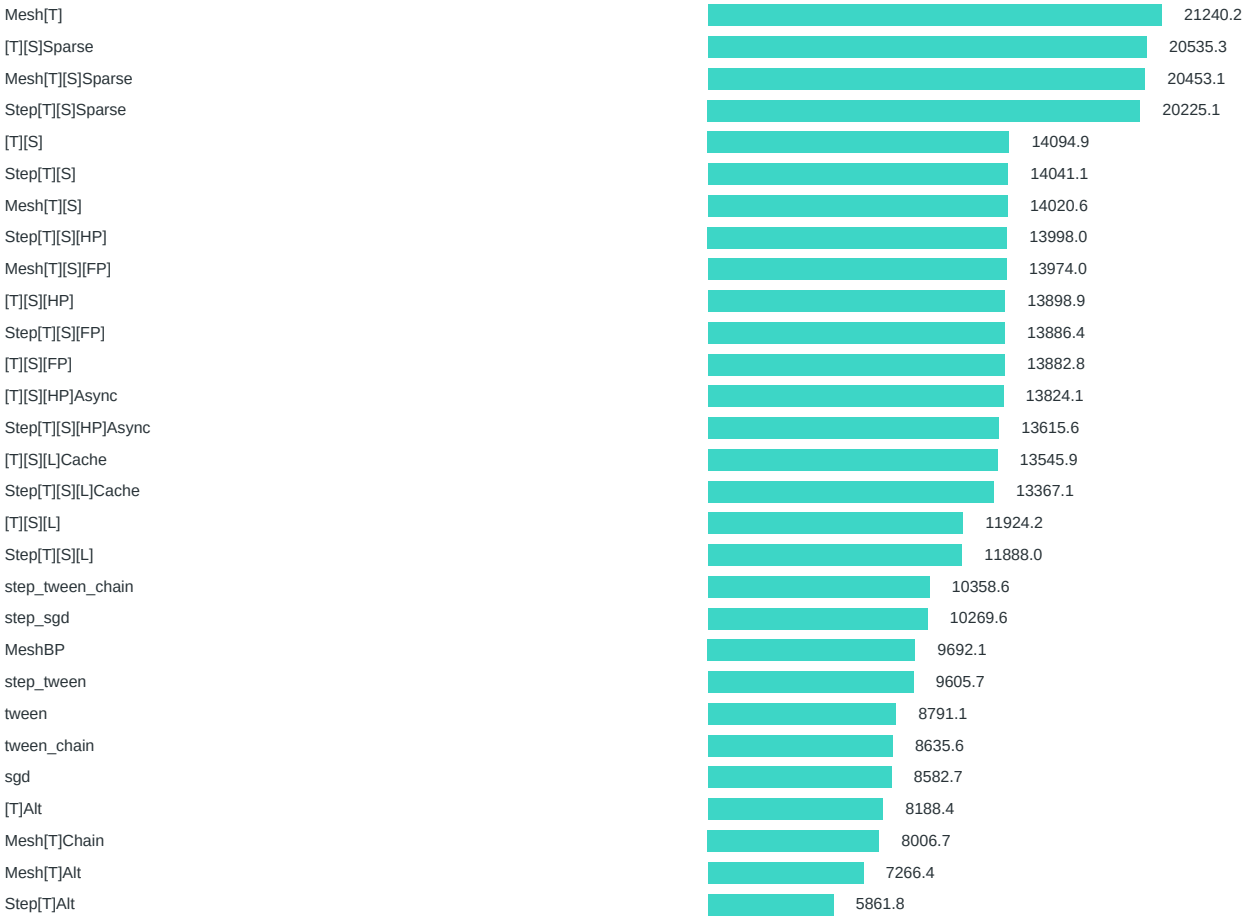
Mean Availability by train mode



Mean Availability by train mode



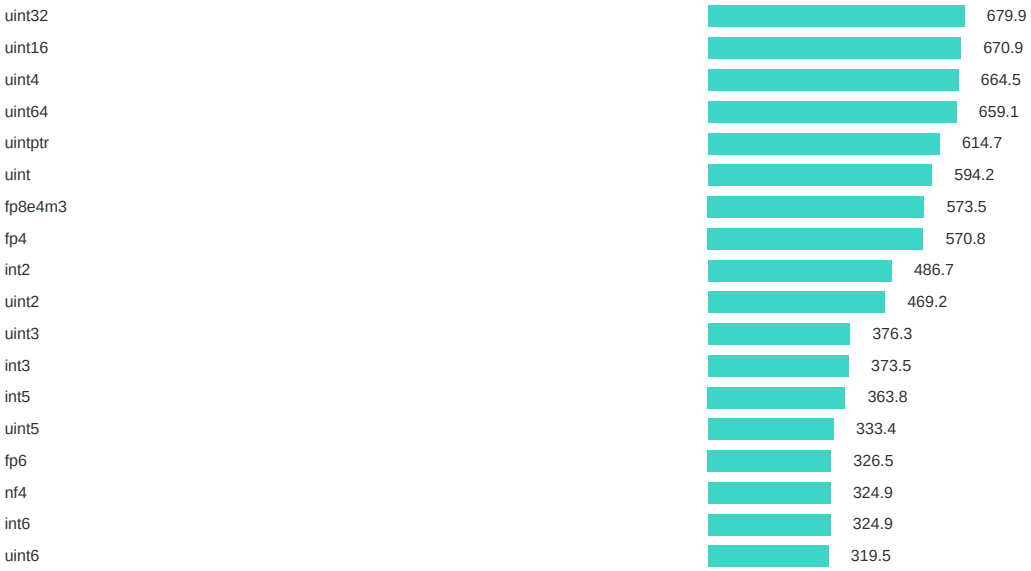
Mean Throughput by train mode



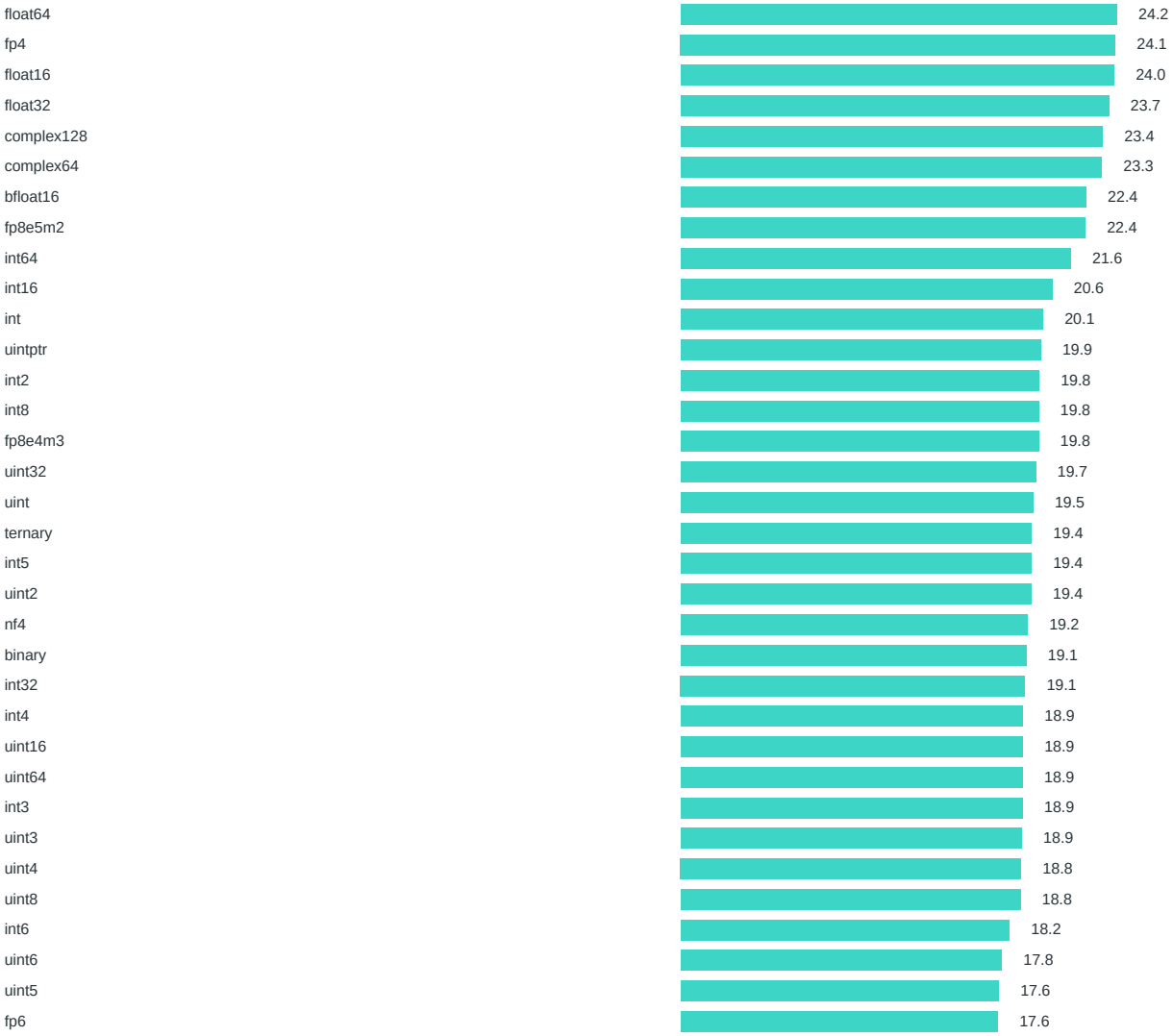
Mean Score by dtype



Mean Score by dtype



Mean hard Acc by dtype



Mean Score by arch



Honesty - mean Score, every mode x dtype (cols 1-12)

Honesty - mean Score, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	519	277	590	365	365	533	474	330	205	420	702	425
Mesh[T]	1483	1706	1061	1172	1692	2639	2139	2741	906	717	1668	1348
Mesh[T]Alt	848	34	745	710	735	1551	1503	79	11	119	799	130
Mesh[T]Chain	467	80	267	542	390	489	417	729	124	181	383	377
Mesh[T][S]	1026	1143	1016	1048	1109	1241	1327	588	222	602	938	754
Mesh[T][S][FP]	1082	1107	1072	1109	1143	1342	1376	508	238	768	793	1108
Mesh[T][S]Sparse	2011	2084	2094	2112	2185	2639	3062	1171	1007	1535	1875	1728
Step[T]Alt	94	95	224	81	151	166	141	104	77	159	60	128
Step[T][S]	1039	759	1118	1122	1134	708	1163	394	436	1066	1039	1013
Step[T][S][FP]	1205	727	943	1075	1188	907	1195	519	289	394	859	570
Step[T][S][HP]	1076	786	1053	1240	723	686	1229	569	391	835	904	977
Step[T][S][HP]Async	990	831	1082	952	1019	651	1183	499	393	656	1079	609
Step[T][S][L]	741	918	846	780	889	639	1050	502	312	583	565	424
Step[T][S][L]Cache	824	833	702	777	785	635	873	532	436	706	722	983
Step[T][S]Sparse	1924	1272	2164	2305	2082	1571	2423	1208	796	1627	1879	1536
[T]Alt	742	70	662	799	794	2585	1571	85	59	86	621	165
[T][S]	1057	814	1169	1061	1226	798	1402	422	479	686	1041	969
[T][S][FP]	1037	877	1168	1037	1068	799	1233	487	311	584	1003	1021
[T][S][HP]	991	1244	1109	1120	1057	846	1368	486	331	784	961	702
[T][S][HP]Async	1147	704	932	1020	1035	764	1434	479	284	815	1038	723
[T][S][L]	832	668	926	884	822	644	1120	529	204	504	715	622
[T][S][L]Cache	818	892	726	676	862	606	974	469	375	705	818	1131
[T][S]Sparse	2024	1837	2020	1899	2045	1600	2615	1200	847	533	2089	1813
sgd	371	352	291	479	488	408	570	274	137	304	417	326
step_sgd	445	448	353	410	539	357	519	380	36	188	338	339
step_tween	396	379	240	367	426	402	628	273	173	237	240	150
step_tween_chain	512	531	417	378	599	377	748	419	58	339	477	348
tween	327	350	426	149	322	388	559	279	195	220	250	90
tween_chain	388	269	488	491	426	324	626	296	136	279	367	253

Honesty - mean Score, every mode x dtype (cols 13-24)

Honesty - mean Score, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	317	254	253	534	440	217	147	424	341	185	300	205
Mesh[T]	1605	3122	853	1524	2049	715	1146	1757	1511	1212	1745	885
Mesh[T]Alt	176	113	72	81	130	57	38	171	217	40	115	96
Mesh[T]Chain	322	91	91	180	168	220	91	502	239	219	240	95
Mesh[T][S]	1117	382	441	1088	734	434	310	778	924	378	764	767
Mesh[T][S][FP]	576	380	413	743	470	455	422	1168	871	283	736	378
Mesh[T][S]Sparse	1964	972	840	1885	1675	956	563	1858	1380	882	1363	1122
Step[T]Alt	94	85	69	80	81	132	71	124	141	69	134	103
Step[T][S]	1502	412	430	893	758	434	451	988	1016	246	1145	799
Step[T][S][FP]	964	507	527	450	1026	312	443	1066	877	257	912	860
Step[T][S][HP]	684	689	449	675	1025	369	460	1036	479	303	938	707
Step[T][S][HP]Async	723	494	459	836	860	323	386	922	777	294	832	640
Step[T][S][L]	747	314	301	780	718	333	272	823	695	278	585	586
Step[T][S][L]Cache	848	529	449	1006	629	401	291	1253	590	320	860	804
Step[T][S]Sparse	1866	901	493	1646	2205	716	709	2220	1121	867	1825	1273
[T]Alt	151	79	50	50	120	84	38	151	152	31	106	161
[T][S]	735	394	730	851	777	412	428	983	1002	216	634	801
[T][S][FP]	583	366	419	579	652	339	359	985	778	279	684	687
[T][S][HP]	532	348	336	373	993	458	258	1081	675	462	890	574
[T][S][HP]Async	776	584	232	804	539	440	260	1066	663	325	564	790
[T][S][L]	710	511	306	803	601	386	329	881	658	337	882	587
[T][S][L]Cache	795	482	505	916	655	362	386	1214	791	345	862	704
[T][S]Sparse	1227	807	834	1375	1413	937	675	2248	1826	786	1117	1610
sgd	453	252	175	461	346	254	154	326	231	131	357	338
step_sgd	212	290	297	391	406	212	192	472	472	183	466	336
step_tween	282	235	164	342	240	105	70	284	296	159	425	563
step_tween_chain	142	174	242	331	311	215	193	559	432	115	507	228
tween	284	120	162	240	266	172	145	210	351	119	472	324
tween_chain	457	229	240	180	327	104	133	541	312	100	361	210

Honesty - mean Score, every mode x dtype (cols 25-34)

Honesty - mean Score, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	265	246	172	432	433	183	160	588	269	536
Mesh[T]	1193	1799	1049	1308	1411	939	763	1447	1370	1285
Mesh[T]Alt	149	63	69	210	82	59	66	109	107	128
Mesh[T]Chain	168	197	202	73	84	62	100	141	258	181
Mesh[T][S]	939	561	444	768	324	430	366	727	616	983
Mesh[T][S][FP]	575	527	412	586	1240	363	268	994	639	327
Mesh[T][S]Sparse	1884	933	662	1763	1772	829	1144	1466	1877	1690
Step[T]Alt	164	81	53	140	109	68	55	201	117	157
Step[T][S]	838	474	379	920	891	401	184	886	797	708
Step[T][S][FP]	640	335	468	485	425	290	173	832	905	845
Step[T][S][HP]	528	463	281	885	911	360	389	601	1029	839
Step[T][S][HP]Async	734	279	449	793	741	345	233	663	836	721
Step[T][S][L]	846	211	134	655	554	269	317	777	615	630
Step[T][S][L]Cache	904	593	355	928	943	356	407	896	744	741
Step[T][S]Sparse	1299	1480	730	1637	1545	664	735	1109	1528	1217
[T]Alt	94	47	27	173	101	46	62	36	59	71
[T][S]	985	733	531	477	763	488	289	1192	710	818
[T][S][FP]	892	345	471	1023	457	515	309	566	949	400
[T][S][HP]	585	210	420	746	847	506	384	562	898	567
[T][S][HP]Async	861	384	441	700	790	313	313	844	776	606
[T][S][L]	599	409	385	491	717	256	265	685	848	417
[T][S][L]Cache	879	452	463	909	663	291	371	503	845	785
[T][S]Sparse	1780	1075	946	1661	1452	645	993	1628	1370	1441
sgd	390	248	143	343	339	191	261	229	361	203
step_sgd	236	347	336	496	432	192	129	228	390	187
step_tween	345	337	242	259	350	120	157	352	413	262
step_tween_chain	192	251	188	226	305	150	48	495	174	360
tween	249	249	239	257	350	136	168	202	335	371
tween_chain	243	279	220	373	238	203	158	154	355	351

Honesty - mean hard Acc, every mode x dtype (cols 1-12)

Honesty - mean hard Acc, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	22	13	27	18	18	22	18	25	20	21	31	19
Mesh[T]	16	23	18	17	23	24	19	24	23	18	23	19
Mesh[T]Alt	25	5	27	26	27	26	26	23	6	23	24	20
Mesh[T]Chain	24	8	13	30	26	23	19	24	19	16	23	20
Mesh[T][S]	24	27	25	25	26	25	24	29	10	18	24	19
Mesh[T][S][FP]	24	23	26	26	25	25	25	24	10	25	18	26
Mesh[T][S]Sparse	24	23	25	25	25	25	25	24	23	22	24	24
Step[T]Alt	14	15	23	11	15	23	17	23	18	23	10	17
Step[T][S]	24	19	25	26	25	25	25	18	19	29	24	24
Step[T][S][FP]	23	17	26	26	25	26	25	25	17	13	24	17
Step[T][S][HP]	23	18	26	26	18	25	25	25	21	25	23	24
Step[T][S][HP]Async	24	19	25	25	25	24	25	24	23	21	25	21
Step[T][S][L]	23	26	26	25	25	25	25	24	22	21	20	17
Step[T][S][L]Cache	24	22	24	25	24	24	25	24	21	22	22	24
Step[T][S]Sparse	24	17	25	25	25	24	24	25	22	22	23	21
[T]Alt	25	12	26	26	27	25	26	21	22	17	23	26
[T][S]	24	18	25	25	26	25	25	23	24	17	24	24
[T][S][FP]	23	20	26	26	25	25	25	24	16	18	24	24
[T][S][HP]	23	29	26	26	25	25	25	24	15	21	24	16
[T][S][HP]Async	24	16	24	24	25	25	25	24	16	23	24	20
[T][S][L]	24	19	25	25	25	25	24	24	15	22	23	19
[T][S][L]Cache	24	19	24	24	25	24	24	24	23	22	23	24
[T][S]Sparse	24	23	25	24	24	24	24	24	20	8	23	24
sgd	22	21	19	31	31	28	31	25	18	22	24	19
step_sgd	21	22	19	19	25	19	19	25	4	11	18	18
step_tween	16	21	13	15	17	20	22	25	19	15	15	11
step_tween_chain	19	23	18	19	25	18	31	25	8	20	23	17
tween	18	19	24	7	17	18	22	24	24	17	18	11
tween_chain	23	16	25	31	28	19	31	25	14	23	24	17

Honesty - mean hard Acc, every mode x dtype (cols 13-24)

Honesty - mean hard Acc, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	15	17	22	27	19	19	14	19	17	18	15	11
Mesh[T]	18	24	16	16	18	18	30	23	21	21	18	16
Mesh[T]Alt	28	32	16	16	19	16	13	19	29	12	22	18
Mesh[T]Chain	27	14	17	17	16	23	12	19	18	22	12	13
Mesh[T][S]	30	18	18	26	20	19	15	18	29	21	18	22
Mesh[T][S][FP]	16	16	20	22	11	20	21	24	21	21	18	11
Mesh[T][S]Sparse	21	19	17	23	21	22	15	22	16	22	17	16
Step[T]Alt	14	20	18	12	12	33	17	17	18	20	16	16
Step[T][S]	36	19	18	22	18	20	23	22	23	16	27	21
Step[T][S][FP]	23	22	25	11	23	13	23	24	21	16	23	23
Step[T][S][HP]	16	37	21	16	22	17	23	23	12	23	20	18
Step[T][S][HP]Async	22	20	22	22	20	17	22	22	22	22	22	21
Step[T][S][L]	24	16	17	23	22	23	21	23	21	22	17	25
Step[T][S][L]Cache	24	22	20	24	18	16	18	24	17	19	19	22
Step[T][S]Sparse	22	21	9	22	25	16	20	24	15	30	21	17
[T]Alt	24	19	17	12	22	29	11	24	23	14	19	28
[T][S]	20	16	29	23	21	18	24	24	24	16	13	25
[T][S][FP]	14	17	21	16	18	15	20	21	18	16	18	19
[T][S][HP]	15	16	20	10	22	22	11	25	16	22	22	16
[T][S][HP]Async	21	20	12	24	16	21	17	23	17	23	15	24
[T][S][L]	24	23	18	23	21	23	22	23	22	21	24	23
[T][S][L]Cache	19	20	24	22	18	20	22	24	17	17	21	23
[T][S]Sparse	12	16	16	16	18	21	16	24	21	22	14	21
sgd	27	19	16	28	21	28	18	19	15	16	19	23
step_sgd	11	17	20	20	19	16	17	17	27	19	22	17
step_tween	16	23	17	16	15	11	6	16	15	18	22	31
step_tween_chain	8	17	17	16	16	15	15	25	17	15	21	11
tween	18	16	20	13	15	21	18	10	22	17	28	22
tween_chain	29	21	27	14	21	11	22	30	18	17	21	15

Honesty - mean hard Acc, every mode x dtype (cols 25-34)

Honesty - mean hard Acc, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	15	16	18	21	20	14	16	26	13	26
Mesh[T]	12	23	18	16	16	17	17	17	18	25
Mesh[T]Alt	25	15	21	30	19	19	22	19	21	29
Mesh[T]Chain	16	23	23	7	8	10	16	12	23	16
Mesh[T][S]	23	27	20	20	11	20	17	19	15	29
Mesh[T][S][FP]	16	24	16	16	26	21	15	24	16	11
Mesh[T][S]Sparse	22	17	16	21	21	20	28	19	21	23
Step[T]Alt	19	17	12	17	14	17	13	22	14	21
Step[T][S]	22	20	16	23	22	21	9	23	19	18
Step[T][S][FP]	16	14	21	16	11	11	10	21	20	24
Step[T][S][HP]	16	22	11	22	22	16	20	18	22	22
Step[T][S][HP]Async	22	11	21	21	22	22	15	19	22	22
Step[T][S][L]	24	12	11	23	17	20	22	24	22	24
Step[T][S][L]Cache	23	24	16	24	24	18	23	24	19	22
Step[T][S]Sparse	16	29	14	21	21	15	21	15	17	16
[T]Alt	18	10	10	28	21	13	21	8	18	17
[T][S]	25	27	23	12	21	21	14	29	19	23
[T][S][FP]	20	13	20	24	13	22	15	15	21	11
[T][S][HP]	15	12	21	22	22	22	15	15	21	16
[T][S][HP]Async	24	15	21	18	23	20	18	24	18	16
[T][S][L]	23	18	23	17	23	17	21	24	28	16
[T][S][L]Cache	22	19	22	22	18	14	22	17	20	23
[T][S]Sparse	22	19	21	22	18	17	23	18	16	21
sgd	25	22	17	22	22	22	31	13	20	15
step_sgd	11	22	25	21	19	16	11	11	16	10
step_tween	20	28	22	13	18	15	17	20	20	15
step_tween_chain	10	19	15	11	15	12	5	21	7	17
tween	15	23	30	15	22	17	22	17	19	25
tween_chain	15	23	22	25	18	21	20	15	21	24

Honesty - mean SoftAcc, every mode x dtype (cols 1-12)

Honesty - mean SoftAcc, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	8	5	9	8	6	7	7		8	4	5	9
Mesh[T]	8	5	14	11	9	6	11		6	10	6	10
Mesh[T]Alt	2	6	4	3	4	3	2	0	8	2	4	5
Mesh[T]Chain	6	8	10	11	7	10	10		10	4	5	11
Mesh[T][S]	1	5	2	1	2	1	1	0	4	1	3	1
Mesh[T][S][FP]	4	10	3	3	5	2	2		9	6	5	3
Mesh[T][S]Sparse	3	9	1	1	2	1	1		5	1	2	1
Step[T]Alt	5	12	8	8	6	6	7		20	9	9	9
Step[T][S]	1	5	1	2	2	1	1	0	6	2	2	2
Step[T][S][FP]	4	11	3	3	5	2	2		10	4	5	3
Step[T][S][HP]	4	9	3	3	5	2	2		8	5	6	3
Step[T][S][HP]Async	1	6	1	1	1	1	1		5	0	2	1
Step[T][S][L]	3	5	2	1	3	1	1		6	4	6	2
Step[T][S][L]Cache	1	7	1	1	2	1	1		2	3	2	1
Step[T][S]Sparse	3	4	1	1	4	1	1		5	1	2	1
[T]Alt	2	6	3	3	4	2	2	0	11	3	2	3
[T][S]	1	4	1	1	1	1	1	0	9	2	2	2
[T][S][FP]	4	11	3	2	5	1	2		9	3	5	2
[T][S][HP]	4	14	2	4	5	1	2		6	5	6	3
[T][S][HP]Async	1	6	1	1	1	0	0		5	2	3	1
[T][S][L]	3	8	2	2	3	1	1		5	3	4	1
[T][S][L]Cache	1	6	1	1	2	1	1		3	2	2	1
[T][S]Sparse	3	6	2	1	4	0	0		5	1	2	1
sgd	8	5	10	9	7	8	8		8	4	4	10
step_sgd	5	7	7	7	6	6	6		8	5	6	7
step_tween	5	5	7	8	5	5	6		17	10	7	7
step_tween_chain	8	7	7	7	6	6	6		9	4	4	7
tween	7	6	9	8	7	6	6		15	9	6	8
tween_chain	9	5	10	9	6	7	8		8	5	5	10

Honesty - mean SoftAcc, every mode x dtype (cols 13-24)

Honesty - mean SoftAcc, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	11	10	10	11	9	7	8	8	9	7	6	12
Mesh[T]	9	1	10	7	2	19	10	14	5	8	6	12
Mesh[T]Alt	8	12	6	8	6	8	6	3	8	9	10	8
Mesh[T]Chain	13	12	13	14	12	6	9	9	11	10	9	13
Mesh[T][S]	6	12	7	6	4	6	8	1	6	6	4	6
Mesh[T][S][FP]	10	19	12	11	8	8	8	2	9	12	8	10
Mesh[T][S]Sparse	9	7	7	9	4	5	6	1	9	8	9	9
Step[T]Alt	11	9	22	12	15	18	20	9	11	21	10	12
Step[T][S]	6	11	5	6	3	11	4	1	6	6	1	6
Step[T][S][FP]	9	13	15	11	10	11	8	2	9	13	11	10
Step[T][S][HP]	11	13	11	9	11	10	9	4	10	9	9	11
Step[T][S][HP]Async	1	10	8	1	4	7	5	1	6	6	7	1
Step[T][S][L]	2	12	2	1	4	5	3	1	4	10	7	2
Step[T][S][L]Cache	3	6	4	3	3	3	2	1	1	5	7	1
Step[T][S]Sparse	9	11	10	9	5	4	8	1	7	9	10	9
[T]Alt	8	11	2	8	5	10	10	3	8	7	6	8
[T][S]	6	6	10	6	3	6	10	3	5	6	3	6
[T][S][FP]	11	13	12	10	9	9	8	3	8	11	10	10
[T][S][HP]	11	12	9	11	8	12	7	3	7	14	13	10
[T][S][HP]Async	1	8	6	1	5	4	3	1	5	7	11	1
[T][S][L]	2	6	5	1	6	9	4	1	2	6	5	2
[T][S][L]Cache	1	5	1	1	2	1	2	1	1	4	7	1
[T][S]Sparse	9	11	9	9	4	7	5	1	9	11	7	9
sgd	12	7	10	12	8	8	8	9	10	8	7	13
step_sgd	11	5	14	10	8	8	8	6	9	8	11	10
step_tween	8	14	11	10	9	13	16	6	9	12	13	10
step_tween_chain	11	13	9	10	9	9	8	6	10	10	12	11
tween	10	12	10	10	12	19	19	8	9	17	6	11
tween_chain	11	12	5	12	6	7	8	9	10	7	7	13

Honesty - mean SoftAcc, every mode x dtype (cols 25-34)

Honesty - mean SoftAcc, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	12	6	7	12	7	6	8	12	10	12
Mesh[T]	8	8	9	10	11	12	13	11	11	9
Mesh[T]Alt	8	5	4	8	5	6	7	8	8	8
Mesh[T]Chain	13	13	7	13	4	5	10	15	10	14
Mesh[T][S]	6	6	7	6	3	10	6	6	5	6
Mesh[T][S][FP]	11	8	8	9	9	10	7	10	9	9
Mesh[T][S]Sparse	9	6	11	9	5	3	9	9	8	9
Step[T]Alt	11	11	13	11	14	16	22	13	11	17
Step[T][S]	6	4	11	6	6	8	4	6	5	6
Step[T][S][FP]	11	10	9	11	7	11	9	11	7	11
Step[T][S][HP]	10	10	10	9	10	10	5	10	10	10
Step[T][S][HP]Async	1	12	5	1	4	5	6	2	3	1
Step[T][S][L]	1	8	6	1	4	4	5	1	5	2
Step[T][S][L]Cache	1	7	1	1	4	7	3	1	1	1
Step[T][S]Sparse	9	10	9	9	4	3	6	8	8	9
[T]Alt	8	5	6	8	6	6	8	7	8	8
[T][S]	6	11	7	6	4	6	6	6	6	6
[T][S][FP]	10	7	12	10	7	9	9	10	10	9
[T][S][HP]	9	11	10	11	8	9	7	10	8	10
[T][S][HP]Async	1	10	8	1	4	5	5	1	2	1
[T][S][L]	2	6	2	2	5	5	4	2	3	2
[T][S][L]Cache	1	6	6	1	4	3	3	1	2	1
[T][S]Sparse	9	8	10	9	5	3	4	9	9	9
sgd	12	10	6	12	7	8	8	13	10	12
step_sgd	10	8	6	9	7	9	8	11	9	11
step_tween	10	11	10	10	9	14	12	9	8	10
step_tween_chain	9	7	9	10	10	9	8	11	9	10
tween	11	13	13	10	13	16	14	11	11	10
tween_chain	13	10	10	12	9	8	7	11	10	12

Honesty - mean Avail, every mode x dtype (cols 1-12)

Honesty - mean Avail, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	21	20	21	20	19	14	15	14	21	20	21	23
Mesh[T]	31	34	32	32	34	25	26	36	35	27	32	34
Mesh[T]Alt	23	11	24	20	21	20	21	7	9	9	27	13
Mesh[T]Chain	18	15	21	19	15	13	14	20	18	16	17	18
Mesh[T][S]	25	26	26	27	27	21	22	18	30	24	27	27
Mesh[T][S][FP]	25	29	28	27	28	20	21	18	28	24	27	29
Mesh[T][S]Sparse	34	40	39	38	35	31	33	27	43	33	36	36
Step[T]Alt	10	11	15	13	14	5	8	9	15	13	12	15
Step[T][S]	26	25	30	28	27	11	19	19	30	27	27	28
Step[T][S][FP]	31	27	24	28	29	13	18	18	29	24	25	27
Step[T][S][HP]	26	26	28	32	26	10	19	20	27	26	26	28
Step[T][S][HP]Async	24	27	30	25	24	10	19	19	26	23	28	23
Step[T][S][L]	22	25	26	23	25	11	20	19	23	24	23	23
Step[T][S][L]Cache	24	24	23	25	25	11	17	19	30	22	26	27
Step[T][S]Sparse	36	35	41	40	38	16	28	28	35	36	36	36
[T]Alt	20	9	21	25	23	16	22	8	11	10	21	12
[T][S]	25	28	31	26	28	12	23	17	28	28	27	29
[T][S][FP]	26	26	30	25	26	12	20	18	29	25	28	29
[T][S][HP]	26	26	29	29	26	12	21	17	29	27	27	29
[T][S][HP]Async	26	28	26	28	26	12	24	17	26	25	28	25
[T][S][L]	24	26	29	26	24	11	21	20	24	20	24	25
[T][S][L]Cache	23	29	25	23	25	11	20	17	24	23	26	30
[T][S]Sparse	37	33	38	35	38	15	29	27	40	34	41	38
sgd	17	17	20	16	18	7	13	13	19	18	19	22
step_sgd	19	18	20	22	19	9	16	16	24	18	18	20
step_tween	20	16	18	22	23	10	17	12	19	18	17	18
step_tween_chain	21	21	23	21	20	9	13	18	17	17	19	22
tween	17	19	18	20	19	10	16	14	19	16	15	16
tween_chain	17	18	22	18	16	9	13	15	21	15	17	20

Honesty - mean Avail, every mode x dtype (cols 13-24)

Honesty - mean Avail, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	21	17	19	17	21	20	18	20	20	17	22	21
Mesh[T]	33	41	32	32	36	35	37	31	30	30	37	27
Mesh[T]Alt	10	8	13	10	12	11	9	13	12	9	10	11
Mesh[T]Chain	14	10	13	14	14	20	18	19	16	14	18	13
Mesh[T][S]	23	17	26	25	21	27	27	26	21	21	27	25
Mesh[T][S][FP]	23	21	22	24	26	29	27	28	26	16	26	27
Mesh[T][S]Sparse	38	27	34	34	32	37	38	33	39	29	37	38
Step[T]Alt	10	10	12	12	11	12	13	11	12	10	14	12
Step[T][S]	26	20	25	26	26	25	25	25	27	18	29	26
Step[T][S][FP]	25	22	24	26	25	31	29	26	25	20	28	27
Step[T][S][HP]	26	17	24	28	27	29	28	25	25	16	30	26
Step[T][S][HP]Async	21	21	24	25	26	24	26	24	22	16	26	24
Step[T][S][L]	24	18	22	25	24	22	21	23	23	15	25	21
Step[T][S][L]Cache	22	21	27	26	23	32	22	28	23	20	29	28
Step[T][S]Sparse	36	25	38	32	37	38	34	35	33	23	40	37
[T]Alt	11	9	10	10	9	10	13	10	12	6	10	11
[T][S]	25	21	28	24	22	28	24	23	26	16	29	23
[T][S][FP]	27	20	23	26	24	25	25	27	28	20	26	28
[T][S][HP]	24	20	20	25	26	25	30	25	28	24	25	28
[T][S][HP]Async	25	21	26	21	22	27	22	27	25	17	24	24
[T][S][L]	22	20	23	25	21	24	24	26	22	21	25	22
[T][S][L]Cache	25	19	24	25	23	22	25	27	27	23	26	23
[T][S]Sparse	37	27	36	36	33	37	37	36	35	27	37	40
sgd	16	16	18	16	17	17	20	18	17	14	20	17
step_sgd	19	17	22	17	18	19	20	22	16	13	19	22
step_tween	17	13	17	20	16	18	21	16	17	14	18	21
step_tween_chain	16	13	22	18	18	22	24	17	22	12	19	21
tween	16	11	16	16	18	16	18	20	16	12	18	17
tween_chain	16	14	17	15	17	17	13	17	18	10	18	18

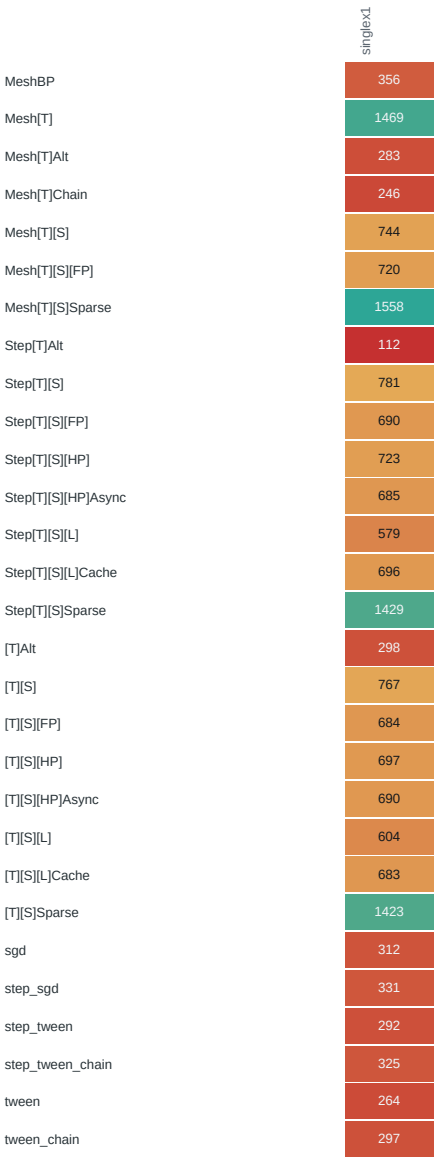
Honesty - mean Avail, every mode x dtype (cols 25-34)

Honesty - mean Avail, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	17	17	18	21	20	23	21	20	20	21
Mesh[T]	32	33	35	31	33	38	34	32	32	29
Mesh[T]Alt	10	10	11	14	8	12	11	9	9	10
Mesh[T]Chain	15	13	18	14	15	16	15	18	13	17
Mesh[T][S]	25	18	26	23	22	29	29	24	27	25
Mesh[T][S][FP]	24	20	29	25	30	23	27	28	26	27
Mesh[T][S]Sparse	37	30	35	39	39	37	40	35	36	38
Step[T]Alt	13	11	13	13	13	12	15	13	13	12
Step[T][S]	23	19	28	26	26	24	29	24	26	29
Step[T][S][FP]	24	22	26	22	25	29	30	26	27	25
Step[T][S][HP]	23	20	28	26	27	27	28	23	28	27
Step[T][S][HP]Async	22	23	26	25	23	23	27	22	24	27
Step[T][S][L]	27	17	20	22	27	21	25	24	22	23
Step[T][S][L]Cache	25	21	25	26	27	28	26	24	25	26
Step[T][S]Sparse	37	29	37	35	34	39	35	35	37	37
[T]Alt	9	10	11	12	9	12	11	9	9	10
[T][S]	24	22	27	26	24	30	29	26	25	26
[T][S][FP]	26	21	27	28	26	30	30	25	27	28
[T][S][HP]	26	18	25	26	25	31	36	26	26	28
[T][S][HP]Async	24	20	25	25	22	21	27	23	26	26
[T][S][L]	19	23	25	23	26	25	22	22	22	25
[T][S][L]Cache	25	19	26	27	23	26	24	21	25	26
[T][S]Sparse	36	32	37	36	36	34	37	38	34	34
sgd	16	15	17	18	17	18	19	18	19	18
step_sgd	20	18	22	20	21	20	19	18	20	20
step_tween	16	16	21	18	19	18	19	17	20	21
step_tween_chain	18	16	21	19	18	22	24	18	21	21
tween	17	14	16	18	18	19	18	14	18	19
tween_chain	19	16	19	16	16	20	20	15	18	17

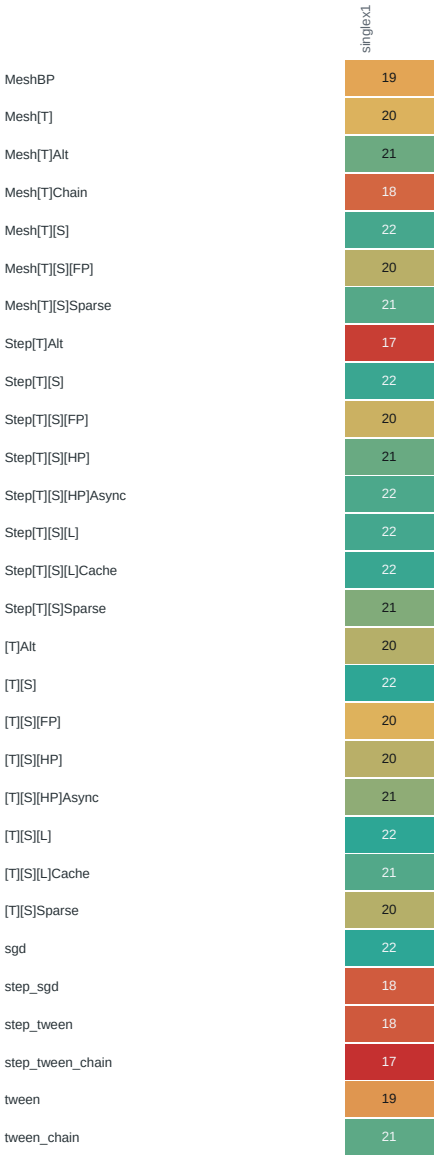
Mean Score, every mode x arch

Mean Score, every mode x arch



Mean hard Acc, every mode x arch

Mean hard Acc, every mode x arch

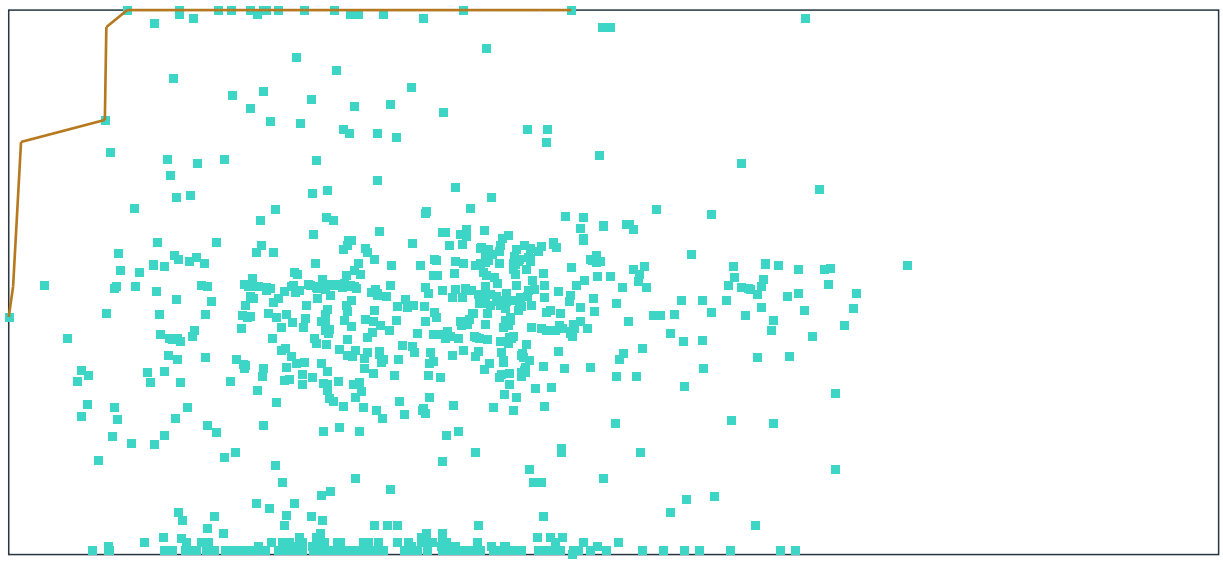


Mean Avail, every mode x arch

Mean Avail, every mode x arch

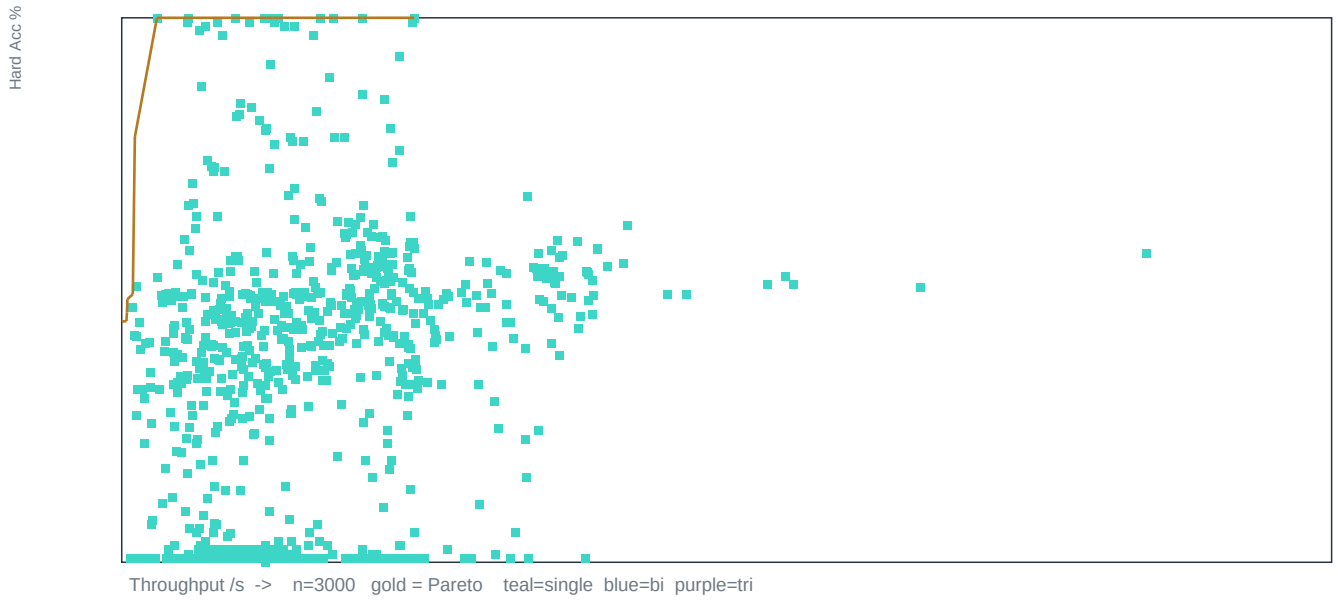
	singlex1
MeshBP	19
Mesh[T]	33
Mesh[T]Alt	13
Mesh[T]Chain	16
Mesh[T][S]	25
Mesh[T][S][FP]	25
Mesh[T][S]Sparse	36
Step[T]Alt	12
Step[T][S]	25
Step[T][S][FP]	25
Step[T][S][HP]	25
Step[T][S][HP]Async	24
Step[T][S][L]	22
Step[T][S][L]Cache	24
Step[T][S]Sparse	34
[T]Alt	12
[T][S]	25
[T][S][FP]	25
[T][S][HP]	26
[T][S][HP]Async	24
[T][S][L]	23
[T][S][L]Cache	24
[T][S]Sparse	35
sgd	17
step_sgd	19
step_tween	18
step_tween_chain	19
tween	17
tween_chain	17

Pillars - Availability vs hard Acc

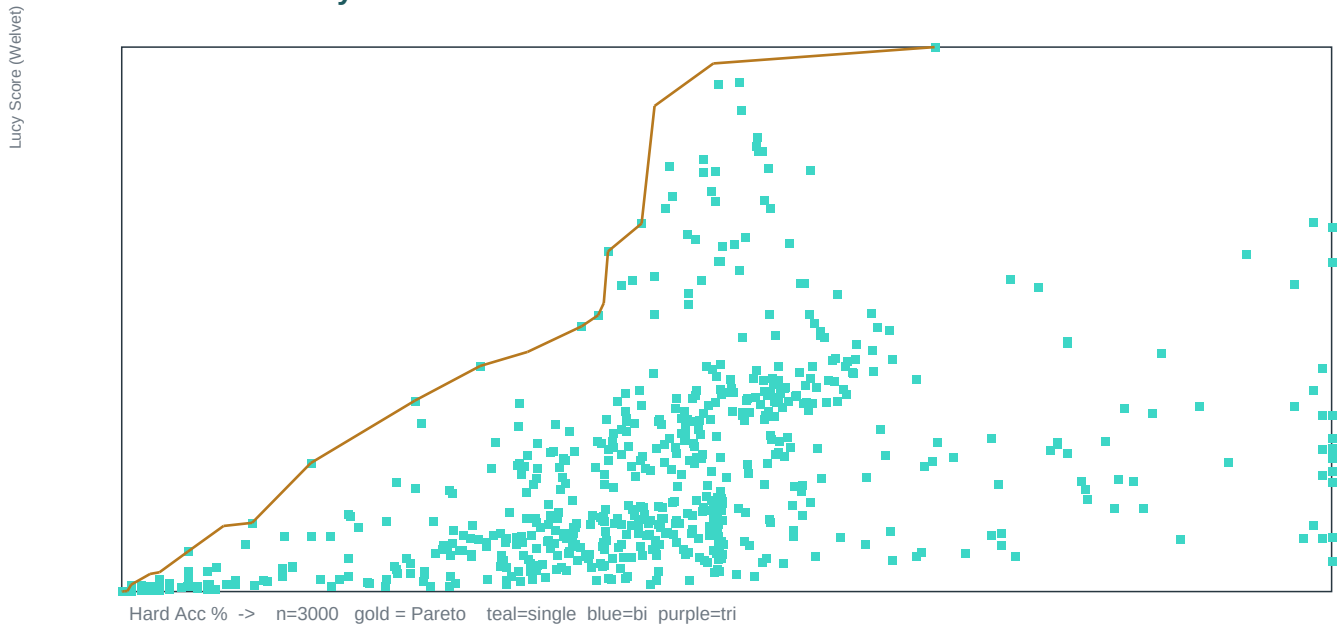



Availability % -> n=3000 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

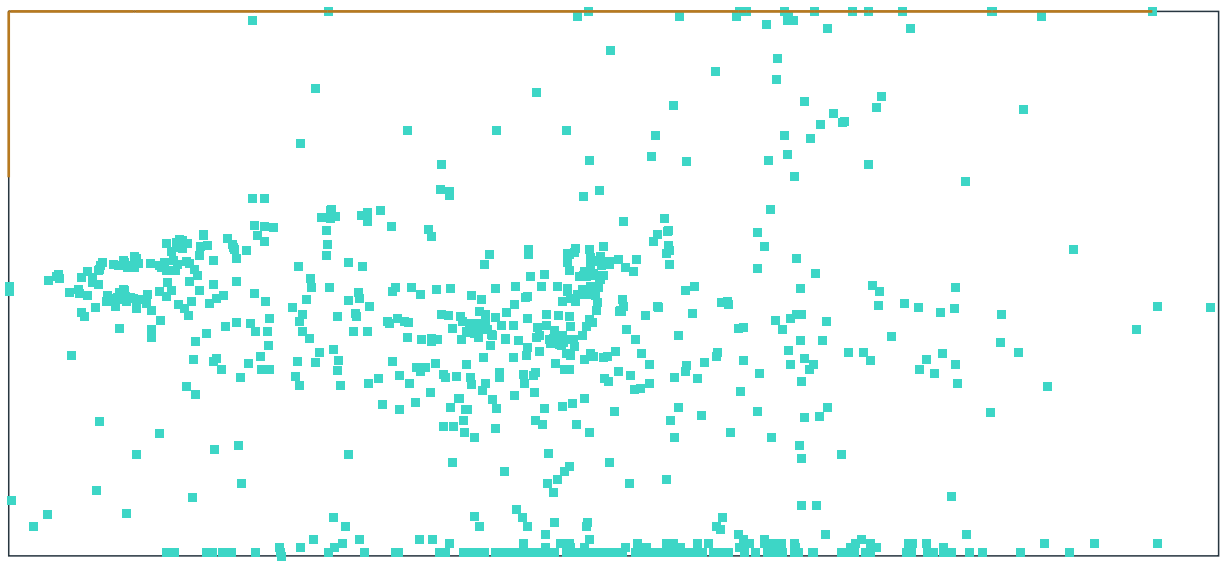
Pillars - Throughput vs hard Acc



Pareto - hard Acc vs Lucy Score

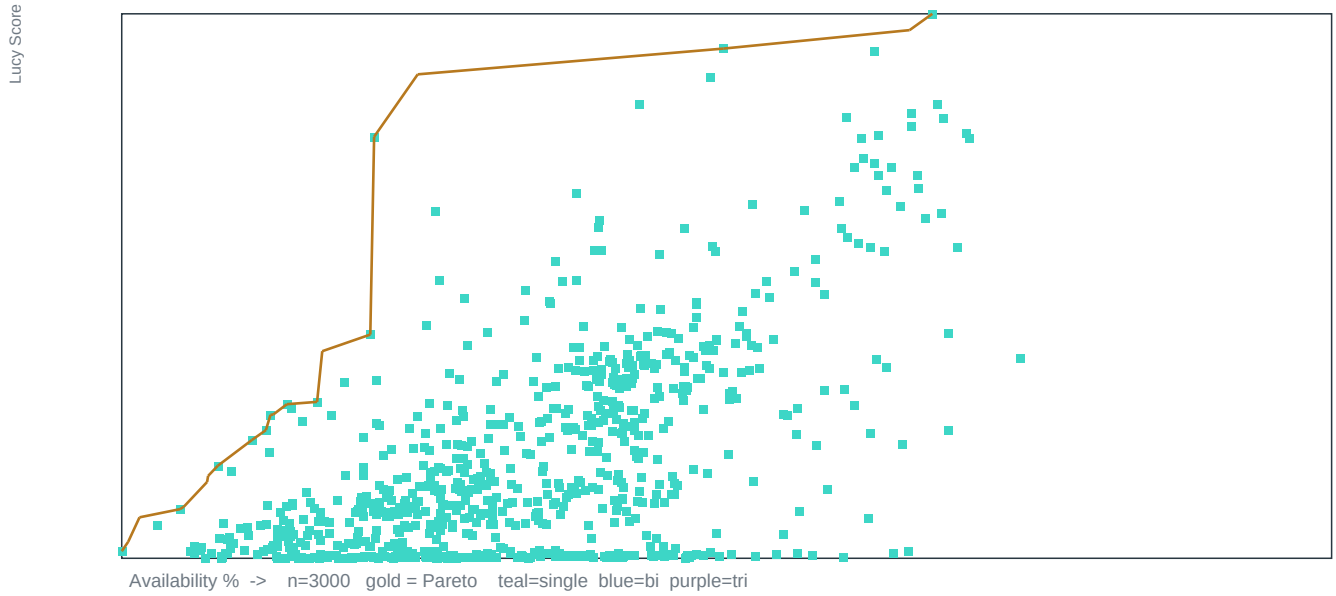


SoftAcc (serve-confidence) vs hard Acc

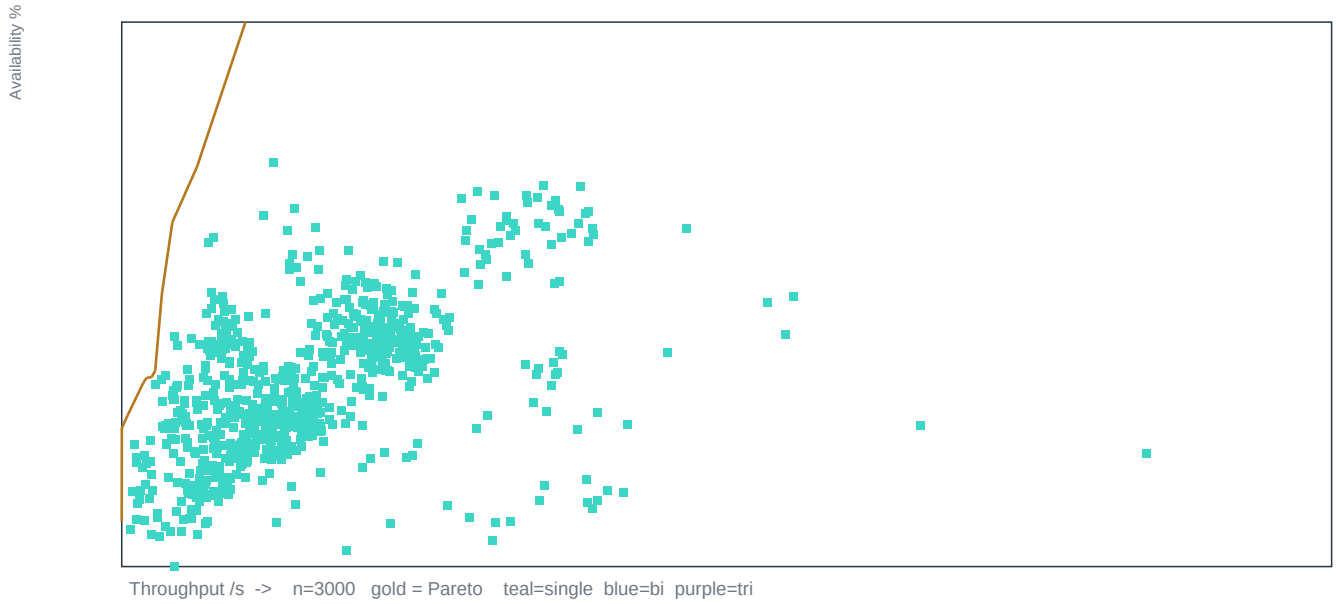



SoftAcc % -> n=3000 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

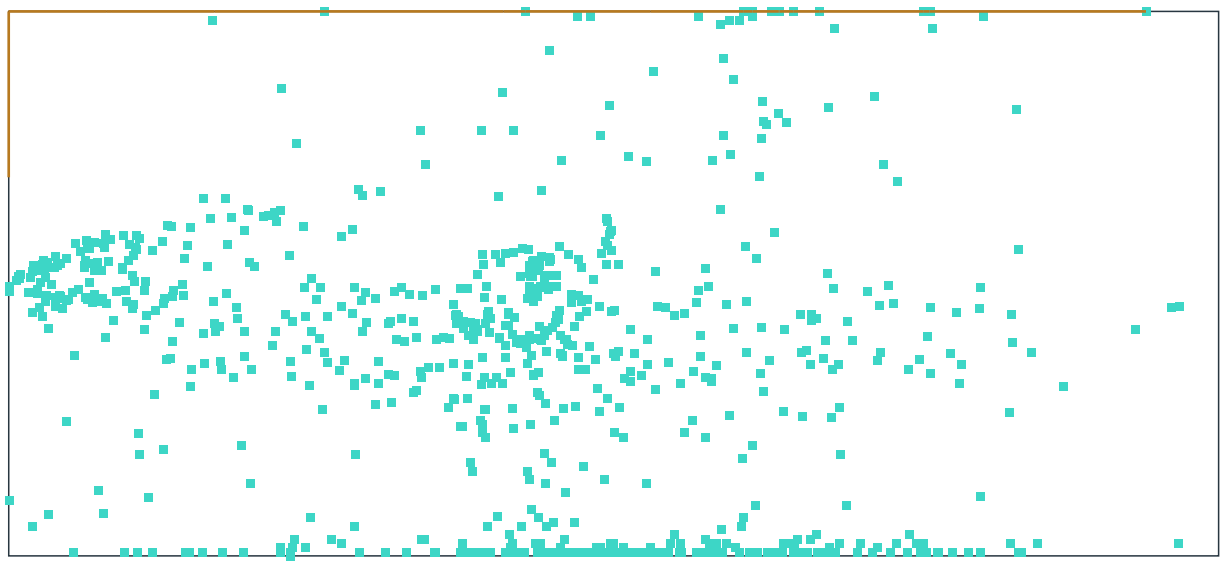
Avail vs Lucy Score (duty clock)



Pillars - Throughput vs Availability



AdaptPct vs hard Acc



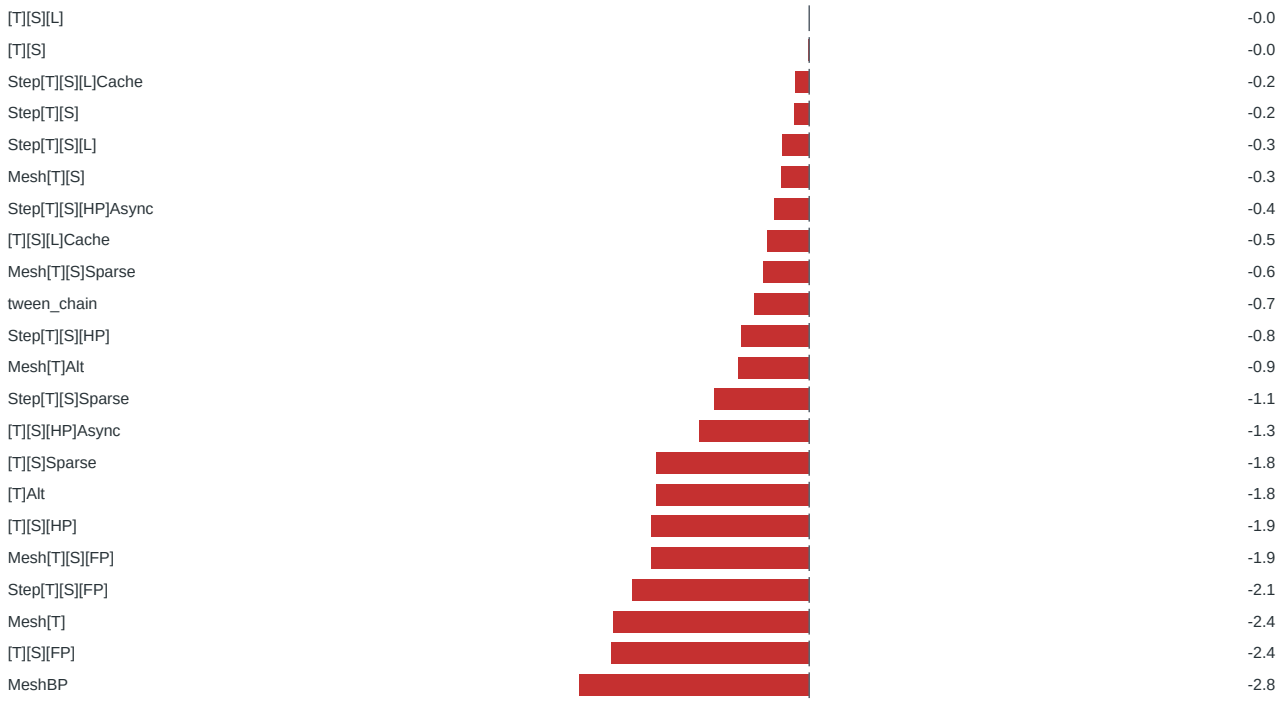

AdaptPct % -> n=3000 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

vs sgd - matched dtype x format x arch

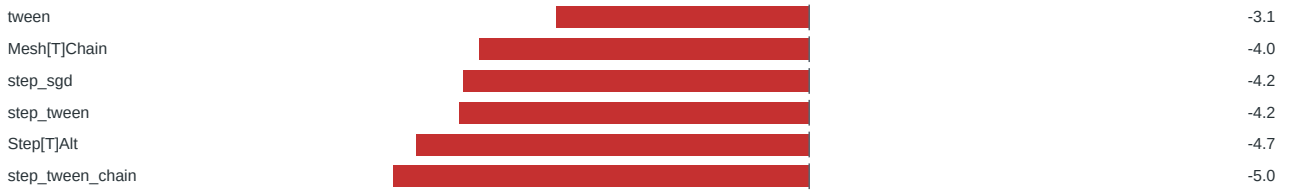
AccDelta is the honest column. ScoreDelta is usually Availability (duty clock), not a better chain rule. Acc win = AccDelta > 0.5. Score win = ScoreDelta > 1. Baseline is discovered from the board, not a frozen StepBP list.

mode	n	AccD	Acc win%	SoftD	AvailD	ThruD	ScoreD	Score win%
[T][S][L]	136	-0.0	48	-5.3	+5.8	+3342	+292.1	92
[T][S]	136	-0.0	49	-3.9	+7.9	+5512	+455.0	90
Step[T][S][L]Cache	136	-0.2	49	-6.0	+7.3	+4784	+384.0	96
Step[T][S]	136	-0.2	50	-4.1	+7.9	+5458	+468.9	90
Step[T][S][L]	136	-0.3	50	-4.9	+5.1	+3305	+267.3	89
Mesh[T][S]	136	-0.3	47	-4.1	+7.5	+5438	+432.1	90
Step[T][S][HP]Async	136	-0.4	49	-5.2	+6.5	+5033	+373.0	96
[T][S][L]Cache	136	-0.5	46	-6.3	+6.6	+4963	+371.4	92
Mesh[T][S]Sparse	136	-0.6	46	-3.1	+18.4	+11870	+1246.5	94
tween_chain	136	-0.7	46	-0.1	-0.5	+53	-14.4	40
Step[T][S][HP]	136	-0.8	47	-0.9	+7.9	+5415	+410.9	91
Mesh[T]Alt	136	-0.9	43	-2.6	-4.2	-1316	-29.1	21
Step[T][S]Sparse	136	-1.1	43	-2.9	+17.3	+11642	+1116.9	91
[T][S][HP]Async	136	-1.3	49	-5.3	+6.8	+5241	+377.8	90
[T][S]Sparse	136	-1.8	43	-3.0	+17.5	+11953	+1110.7	88
[T]Alt	136	-1.8	46	-2.8	-4.7	-394	-13.8	21
[T][S][HP]	136	-1.9	43	-0.9	+8.4	+5316	+385.4	88
Mesh[T][S][FP]	136	-1.9	48	-0.9	+8.1	+5391	+407.9	87
Step[T][S][FP]	136	-2.1	50	-0.6	+8.3	+5304	+378.5	86
Mesh[T]	136	-2.4	49	+0.3	+15.6	+12657	+1157.7	85
[T][S][FP]	136	-2.4	46	-1.0	+8.2	+5300	+372.4	86
MeshBP	136	-2.8	41	-0.4	+2.3	+1109	+44.4	63
tween	136	-3.1	43	+1.8	-0.5	+208	-47.8	45
Mesh[T]Chain	136	-4.0	42	+1.0	-1.1	-576	-65.6	34
step_sgd	136	-4.2	32	-0.7	+1.8	+1687	+19.2	60
step_tween	136	-4.2	37	+0.7	+0.7	+1023	-20.2	46
Step[T]Alt	136	-4.7	31	+3.4	-5.1	-2721	-199.7	2
step_tween_chain	136	-5.0	29	-0.3	+1.9	+1776	+13.0	54

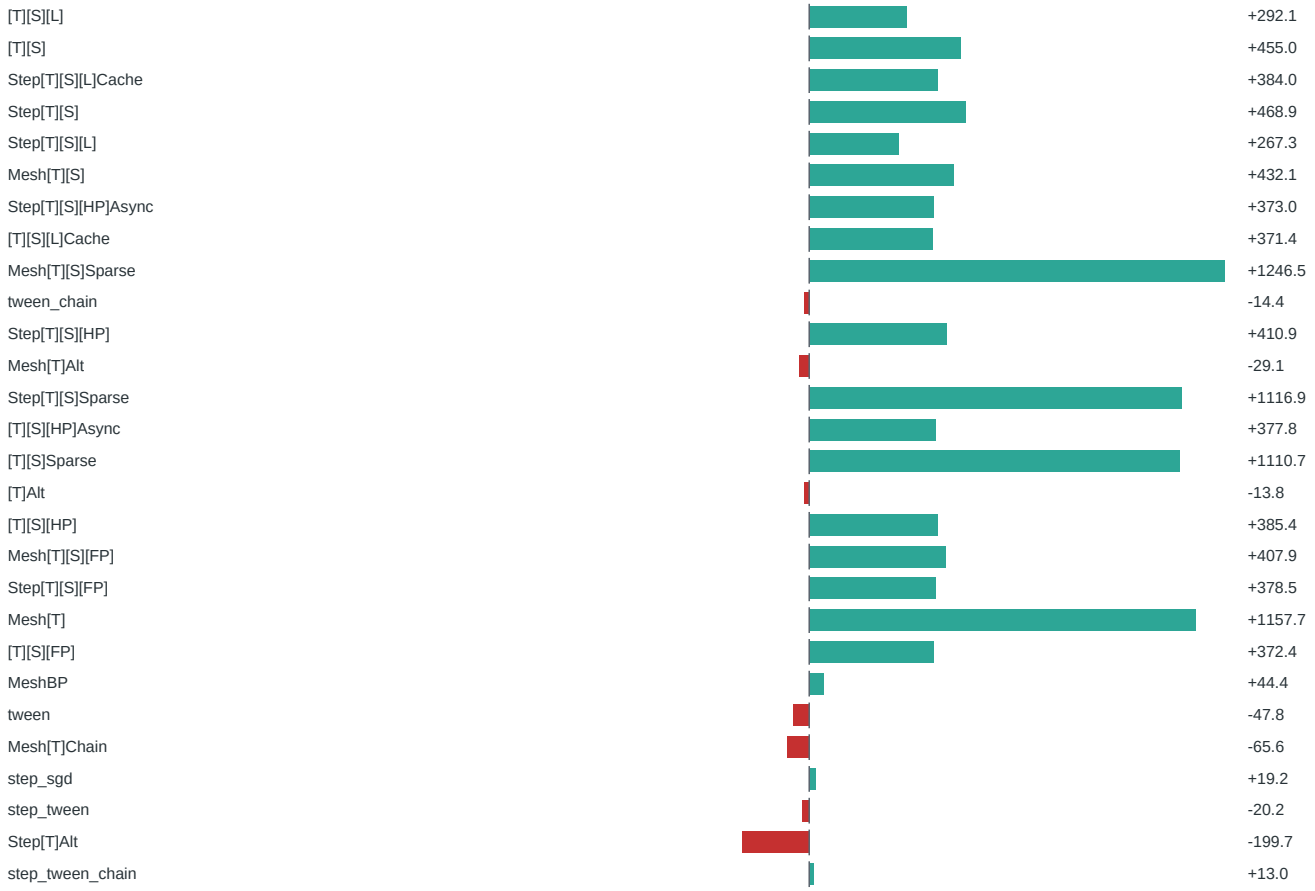
mean AccD vs sgd



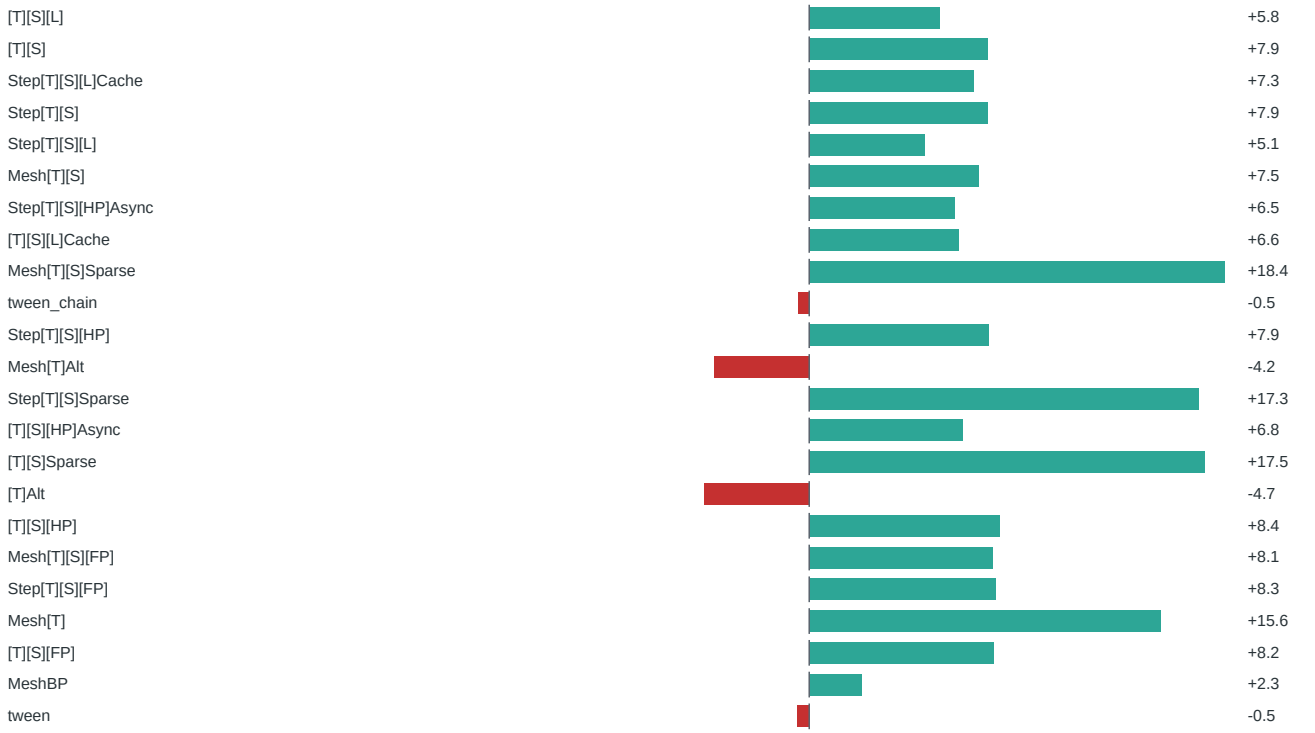
mean AccD vs sgd



mean ScoreD vs sgd (duty clock)



mean AvailD vs sgd



mean AvailD vs sgd



AccD vs sgd, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	-0	-8	+8	-12	-12	-6	-13	+0	+2	-0	+7	+0
Mesh[T]	-7	+2	-1	-14	-8	-4	-12	-0	+5	-4	-0	+0
Mesh[T]Alt	+2	-15	+8	-5	-4	-2	-5	-1	-12	+2	-0	+2
Mesh[T]Chain	+2	-13	-6	-1	-5	-5	-12	-0	+1	-6	-0	+1
Mesh[T][S]	+2	+6	+7	-6	-5	-3	-6	+5	-8	-4	+0	+1
Mesh[T][S][FP]	+2	+2	+7	-5	-6	-3	-5	-0	-8	+3	-5	+7
Mesh[T][S]Sparse	+2	+2	+6	-6	-5	-3	-6	-0	+5	+0	+0	+5
Step[T]Alt	-8	-6	+4	-20	-16	-5	-14	-1	-0	+1	-14	-2
Step[T][S]	+2	-2	+6	-5	-5	-3	-6	-7	+1	+8	+0	+5
Step[T][S][FP]	+1	-4	+7	-5	-6	-3	-6	+0	-1	-9	-0	-2
Step[T][S][HP]	+1	-3	+7	-5	-12	-3	-5	+0	+3	+3	-1	+5
Step[T][S][HP]Async	+1	-1	+6	-6	-6	-4	-6	-1	+5	-1	+1	+2
Step[T][S][L]	+1	+6	+7	-5	-5	-3	-6	-0	+4	-1	-4	-2
Step[T][S][L]Cache	+2	+2	+5	-6	-6	-4	-6	-0	+3	+0	-1	+6
Step[T][S]Sparse	+1	-4	+6	-5	-6	-4	-6	-0	+4	+0	-0	+2
[T]Alt	+3	-9	+7	-5	-4	-3	-5	-4	+4	-4	-0	+7
[T][S]	+2	-3	+6	-6	-5	-3	-6	-2	+6	-5	+1	+6
[T][S][FP]	+1	-0	+7	-5	-6	-3	-6	-0	-2	-4	+0	+5
[T][S][HP]	+1	+8	+7	-5	-5	-3	-5	-0	-3	-0	+0	-2
[T][S][HP]Async	+2	-5	+6	-7	-6	-3	-6	-0	-1	+1	+0	+1
[T][S][L]	+2	-2	+6	-5	-6	-3	-6	-0	-3	-0	-0	+1
[T][S][L]Cache	+1	-1	+5	-7	-6	-4	-6	-0	+5	-0	-0	+6
[T][S]Sparse	+1	+2	+6	-6	-7	-4	-7	-0	+2	-14	-1	+5
step_sgd	-1	+1	-0	-12	-6	-10	-12	+0	-14	-11	-6	-1
step_tween	-6	-0	-6	-15	-14	-8	-9	+0	+1	-7	-9	-7
step_tween_chain	-3	+2	-0	-12	-5	-10	+0	+0	-10	-2	-1	-1
tween	-4	-1	+6	-24	-14	-10	-9	-1	+6	-4	-6	-8
tween_chain	+0	-5	+7	-0	-3	-9	+0	+0	-4	+1	+0	-1

AccD vs sgd, every mode x dtype (cols 13-24)

AccD vs sgd, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	-12	-2	+7	-1	-2	-9	-3	-0	+1	+2	-4	-12
Mesh[T]	-9	+6	+1	-11	-3	-10	+12	+3	+5	+5	-1	-7
Mesh[T]Alt	+1	+13	+0	-12	-2	-13	-5	-0	+14	-4	+3	-5
Mesh[T]Chain	+0	-5	+1	-11	-6	-6	-6	+0	+3	+6	-7	-10
Mesh[T][S]	+3	-1	+2	-1	-1	-9	-3	-2	+14	+5	-1	-1
Mesh[T][S][FP]	-12	-2	+5	-6	-10	-8	+4	+4	+6	+5	-1	-12
Mesh[T][S]Sparse	-6	-0	+2	-4	+0	-6	-3	+3	+0	+6	-1	-7
Step[T]Alt	-13	+1	+2	-16	-9	+4	-1	-3	+3	+4	-3	-7
Step[T][S]	+8	-0	+2	-6	-3	-8	+5	+2	+8	+0	+8	-2
Step[T][S][FP]	-4	+3	+9	-17	+2	-16	+5	+5	+6	+0	+4	+1
Step[T][S][HP]	-11	+18	+5	-12	+1	-11	+5	+4	-3	+7	+1	-4
Step[T][S][HP]Async	-5	+1	+6	-5	-1	-12	+4	+2	+7	+6	+3	-2
Step[T][S][L]	-4	-3	+1	-4	+1	-6	+3	+4	+6	+7	-2	+3
Step[T][S][L]Cache	-3	+3	+4	-4	-4	-13	-0	+5	+2	+3	+0	-1
Step[T][S]Sparse	-5	+2	-6	-6	+4	-13	+3	+5	+0	+14	+2	-6
[T]Alt	-3	+0	+1	-16	+0	+0	-6	+5	+8	-2	+0	+6
[T][S]	-8	-3	+13	-5	-0	-10	+6	+4	+9	+0	-6	+2
[T][S][FP]	-14	-2	+5	-12	-4	-13	+2	+2	+2	+0	-1	-3
[T][S][HP]	-12	-3	+5	-17	+1	-7	-7	+6	+1	+6	+4	-7
[T][S][HP]Async	-6	+1	-4	-3	-5	-7	-1	+4	+2	+7	-3	+1
[T][S][L]	-3	+4	+2	-4	-0	-6	+4	+4	+6	+5	+5	+1
[T][S][L]Cache	-8	+1	+8	-5	-3	-8	+4	+5	+2	+1	+2	-0
[T][S]Sparse	-15	-2	+1	-11	-3	-8	-2	+5	+6	+6	-4	-2
step_sgd	-17	-1	+4	-8	-2	-12	-1	-2	+11	+3	+3	-6
step_tween	-12	+4	+2	-11	-6	-18	-11	-4	-0	+2	+3	+8
step_tween_chain	-19	-2	+2	-11	-5	-13	-2	+6	+1	-1	+3	-12
tween	-9	-3	+4	-15	-6	-8	+0	-10	+7	+1	+9	-1
tween_chain	+2	+2	+11	-14	-1	-17	+5	+11	+3	+1	+2	-8

AccD vs sgd, every mode x dtype (cols 25-34)

AccD vs sgd, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	-10	-5	+1	-1	-2	-7	-15	+13	-7	+12
Mesh[T]	-13	+1	+1	-5	-6	-5	-14	+4	-2	+11
Mesh[T]Alt	-0	-7	+4	+8	-3	-3	-8	+6	+1	+15
Mesh[T]Chain	-8	+2	+6	-15	-14	-11	-15	-1	+4	+2
Mesh[T][S]	-2	+6	+2	-1	-11	-1	-14	+6	-5	+15
Mesh[T][S][FP]	-9	+2	-2	-6	+4	-1	-16	+10	-4	-4
Mesh[T][S]Sparse	-3	-5	-2	-0	-2	-1	-3	+6	+1	+8
Step[T]Alt	-6	-5	-5	-5	-8	-4	-18	+8	-6	+7
Step[T][S]	-3	-2	-1	+2	-0	-1	-22	+10	-1	+4
Step[T][S][FP]	-9	-8	+4	-6	-11	-10	-21	+8	+1	+9
Step[T][S][HP]	-9	+0	-6	+1	-0	-6	-11	+5	+2	+8
Step[T][S][HP]Async	-3	-10	+4	-0	-0	+0	-16	+6	+2	+8
Step[T][S][L]	-1	-9	-6	+1	-6	-2	-9	+11	+2	+10
Step[T][S][L]Cache	-2	+2	-1	+2	+2	-4	-8	+11	-1	+7
Step[T][S]Sparse	-9	+8	-3	-0	-1	-6	-10	+2	-3	+2
[T]Alt	-7	-11	-8	+6	-1	-8	-10	-5	-2	+2
[T][S]	-0	+6	+5	-10	-1	-1	-17	+16	-1	+8
[T][S][FP]	-4	-8	+3	+2	-9	+0	-16	+2	+1	-4
[T][S][HP]	-9	-10	+3	+1	+0	+0	-16	+2	+1	+2
[T][S][HP]Async	-1	-7	+3	-3	+1	-1	-13	+10	-2	+2
[T][S][L]	-2	-4	+6	-5	+1	-5	-10	+10	+8	+2
[T][S][L]Cache	-3	-2	+5	+1	-4	-7	-9	+4	+0	+8
[T][S]Sparse	-3	-2	+3	+0	-4	-5	-8	+5	-4	+7
step_sgd	-14	+1	+8	-0	-3	-5	-20	-2	-4	-4
step_tween	-5	+6	+4	-8	-4	-7	-14	+7	-0	-0
step_tween_chain	-14	-3	-2	-11	-7	-10	-26	+8	-13	+3
tween	-10	+1	+12	-6	-0	-4	-9	+4	-1	+10
tween_chain	-10	+2	+4	+4	-4	-1	-11	+2	+1	+9

ScoreD vs sgd, every mode x dtype (cols 1-12)

ScoreD vs sgd, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	+148	-74	+300	-114	-122	+125	-96	+56	+68	+116	+285	+99
Mesh[T]	+1113	+1355	+770	+693	+1204	+2230	+1568	+2467	+769	+414	+1251	+1022
Mesh[T]Alt	+477	-317	+455	+231	+247	+1143	+932	-195	-126	-185	+382	-195
Mesh[T]Chain	+96	-272	-23	+64	-98	+81	-153	+455	-13	-123	-35	+51
Mesh[T][S]	+655	+792	+725	+569	+621	+833	+757	+314	+85	+298	+521	+429
Mesh[T][S][FP]	+711	+755	+781	+630	+655	+934	+806	+234	+100	+465	+376	+782
Mesh[T][S]Sparse	+1640	+1733	+1803	+1633	+1697	+2231	+2492	+897	+870	+1232	+1458	+1402
Step[T]Alt	-276	-257	-66	-398	-336	-243	-429	-169	-60	-145	-357	-198
Step[T][S]	+668	+408	+827	+643	+646	+300	+592	+120	+299	+762	+622	+687
Step[T][S][FP]	+834	+376	+653	+596	+700	+499	+624	+246	+152	+90	+442	+245
Step[T][S][HP]	+706	+434	+763	+761	+235	+278	+659	+295	+254	+532	+487	+651
Step[T][S][HP]Async	+619	+479	+791	+473	+531	+243	+613	+226	+256	+352	+661	+283
Step[T][S][L]	+370	+567	+555	+302	+401	+231	+479	+228	+175	+279	+148	+99
Step[T][S][L]Cache	+453	+481	+412	+299	+297	+227	+303	+259	+298	+402	+305	+658
Step[T][S]Sparse	+1554	+921	+1873	+1826	+1594	+1163	+1852	+935	+658	+1324	+1462	+1210
[T]Alt	+371	-282	+372	+320	+307	+2177	+1001	-188	-78	-218	+204	-160
[T][S]	+686	+463	+878	+582	+738	+390	+832	+149	+342	+383	+624	+643
[T][S][FP]	+666	+525	+878	+558	+580	+391	+663	+214	+173	+280	+586	+695
[T][S][HP]	+620	+893	+819	+642	+570	+438	+798	+212	+194	+481	+544	+376
[T][S][HP]Async	+777	+353	+642	+542	+547	+356	+864	+205	+147	+511	+621	+398
[T][S][L]	+461	+316	+636	+406	+334	+236	+550	+255	+66	+200	+298	+296
[T][S][L]Cache	+447	+540	+436	+197	+374	+197	+403	+195	+237	+401	+401	+806
[T][S]Sparse	+1653	+1486	+1729	+1421	+1557	+1192	+2045	+927	+709	+229	+1672	+1487
step_sgd	+75	+96	+63	-68	+51	-51	-51	+107	-101	-116	-79	+13
step_tween	+25	+27	-50	-112	-62	-7	+58	-1	+35	-66	-177	-175
step_tween_chain	+141	+179	+126	-100	+111	-32	+178	+145	-79	+36	+60	+22
tween	-43	-2	+135	-330	-165	-20	-12	+5	+58	-84	-167	-236
tween_chain	+17	-82	+197	+13	-62	-84	+56	+22	-1	-25	-50	-72

ScoreD vs sgd, every mode x dtype (cols 13-24)

ScoreD vs sgd, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	-136	+2	+78	+73	+94	-37	-7	+99	+111	+54	-57	-133
Mesh[T]	+1152	+2871	+678	+1062	+1703	+462	+992	+1432	+1280	+1081	+1388	+547
Mesh[T]Alt	-277	-139	-103	-380	-217	-197	-117	-155	-13	-91	-243	-242
Mesh[T]Chain	-131	-161	-84	-281	-178	-34	-64	+177	+8	+88	-117	-243
Mesh[T][S]	+664	+130	+265	+626	+388	+180	+156	+452	+693	+247	+407	+429
Mesh[T][S][FP]	+123	+128	+238	+282	+123	+201	+267	+842	+640	+151	+379	+41
Mesh[T][S]Sparse	+1511	+720	+665	+1424	+1328	+702	+409	+1533	+1150	+750	+1005	+785
Step[T]Alt	-360	-166	-106	-381	-266	-121	-83	-201	-89	-62	-223	-234
Step[T][S]	+1048	+160	+255	+432	+412	+181	+296	+662	+786	+115	+788	+461
Step[T][S][FP]	+511	+255	+352	-11	+679	+58	+289	+740	+646	+126	+554	+523
Step[T][S][HP]	+231	+438	+274	+214	+679	+115	+306	+710	+249	+172	+580	+369
Step[T][S][HP]Async	+270	+242	+284	+374	+514	+70	+231	+597	+546	+163	+474	+302
Step[T][S][L]	+294	+62	+126	+319	+372	+79	+117	+497	+465	+147	+228	+248
Step[T][S][L]Cache	+395	+277	+274	+544	+283	+148	+137	+927	+359	+189	+503	+466
Step[T][S]Sparse	+1413	+649	+318	+1184	+1859	+462	+554	+1895	+890	+736	+1468	+935
[T]Alt	-302	-173	-125	-411	-227	-170	-117	-175	-78	-100	-251	-176
[T][S]	+281	+142	+555	+390	+430	+158	+274	+658	+771	+85	+277	+464
[T][S][FP]	+129	+114	+244	+118	+306	+85	+204	+659	+547	+148	+327	+350
[T][S][HP]	+79	+97	+161	-89	+647	+204	+103	+755	+444	+331	+533	+237
[T][S][HP]Async	+323	+333	+56	+343	+192	+187	+105	+740	+432	+193	+207	+452
[T][S][L]	+257	+259	+131	+342	+254	+132	+175	+555	+427	+206	+525	+249
[T][S][L]Cache	+342	+230	+330	+455	+308	+108	+232	+889	+560	+214	+505	+366
[T][S]Sparse	+774	+555	+658	+914	+1066	+684	+521	+1923	+1595	+655	+759	+1272
step_sgd	-241	+38	+122	-70	+60	-42	+38	+146	+241	+52	+109	-2
step_tween	-171	-17	-12	-120	-106	-149	-84	-42	+66	+28	+68	+225
step_tween_chain	-312	-78	+67	-130	-36	-39	+38	+234	+201	-16	+150	-110
tween	-169	-132	-13	-222	-81	-82	-9	-116	+121	-12	+114	-14
tween_chain	+4	-23	+65	-281	-20	-150	-21	+215	+81	-31	+4	-128

ScoreD vs sgd, every mode x dtype (cols 25-34)

ScoreD vs sgd, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	-125	-2	+29	+89	+95	-8	-101	+359	-93	+333
Mesh[T]	+803	+1551	+906	+965	+1073	+748	+502	+1218	+1009	+1082
Mesh[T]Alt	-241	-185	-74	-134	-257	-131	-195	-121	-254	-75
Mesh[T]Chain	-222	-50	+59	-270	-254	-129	-161	-88	-103	-22
Mesh[T][S]	+550	+313	+301	+425	-14	+239	+105	+498	+254	+780
Mesh[T][S][FP]	+186	+280	+269	+243	+902	+173	+7	+765	+278	+124
Mesh[T][S]Sparse	+1495	+685	+519	+1419	+1433	+638	+883	+1237	+1516	+1487
Step[T]Alt	-225	-167	-90	-203	-230	-122	-206	-28	-244	-46
Step[T][S]	+449	+226	+236	+577	+553	+210	-76	+656	+435	+505
Step[T][S][FP]	+250	+87	+325	+141	+86	+100	-88	+603	+544	+641
Step[T][S][HP]	+138	+216	+138	+542	+573	+169	+128	+372	+668	+636
Step[T][S][HP]Async	+345	+32	+305	+450	+402	+155	-28	+434	+474	+518
Step[T][S][L]	+456	-37	-10	+312	+215	+78	+57	+548	+254	+427
Step[T][S][L]Cache	+515	+345	+212	+585	+605	+166	+146	+667	+383	+538
Step[T][S]Sparse	+910	+1232	+587	+1294	+1206	+473	+474	+880	+1167	+1014
[T]Alt	-296	-200	-116	-170	-237	-145	-199	-193	-302	-132
[T][S]	+596	+486	+388	+134	+424	+297	+28	+962	+349	+614
[T][S][FP]	+502	+98	+328	+679	+119	+324	+48	+337	+588	+197
[T][S][HP]	+196	-38	+276	+403	+508	+315	+123	+332	+537	+363
[T][S][HP]Async	+471	+136	+297	+357	+452	+123	+52	+615	+415	+403
[T][S][L]	+209	+161	+242	+148	+379	+65	+5	+456	+486	+214
[T][S][L]Cache	+489	+204	+320	+566	+325	+100	+110	+273	+484	+581
[T][S]Sparse	+1390	+827	+803	+1318	+1114	+454	+732	+1398	+1009	+1237
step_sgd	-154	+99	+193	+153	+93	+2	-132	-1	+29	-17
step_tween	-44	+89	+99	-84	+12	-70	-104	+123	+52	+59
step_tween_chain	-198	+4	+45	-117	-34	-41	-212	+266	-187	+157
tween	-141	+1	+96	-86	+11	-54	-92	-27	-26	+167
tween_chain	-147	+31	+77	+29	-100	+13	-103	-76	-6	+147

AvailD vs sgd, every mode x dtype (cols 1-12)

AvailD vs sgd, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	+4	+3	+1	+4	+1	+6	+2	+1	+2	+3	+2	+1
Mesh[T]	+14	+17	+13	+16	+16	+18	+13	+23	+16	+9	+13	+12
Mesh[T]Alt	+6	-6	+4	+4	+3	+12	+8	-7	-10	-8	+8	-9
Mesh[T]Chain	+2	-1	+1	+3	-2	+6	+1	+7	-1	-2	-2	-4
Mesh[T][S]	+8	+10	+7	+11	+9	+14	+8	+5	+11	+6	+8	+5
Mesh[T][S][FP]	+9	+12	+8	+11	+10	+13	+8	+4	+9	+6	+8	+7
Mesh[T][S]Sparse	+18	+23	+19	+22	+17	+23	+20	+13	+24	+16	+17	+14
Step[T]Alt	-6	-6	-5	-3	-4	-2	-5	-4	-4	-5	-7	-7
Step[T][S]	+9	+9	+10	+11	+9	+4	+6	+5	+11	+9	+8	+6
Step[T][S][FP]	+14	+10	+5	+11	+12	+6	+5	+5	+10	+7	+6	+5
Step[T][S][HP]	+10	+10	+8	+16	+8	+3	+6	+7	+8	+8	+7	+6
Step[T][S][HP]Async	+8	+10	+10	+9	+6	+3	+6	+5	+7	+6	+9	+1
Step[T][S][L]	+6	+8	+6	+7	+7	+3	+7	+5	+5	+7	+4	+1
Step[T][S][L]Cache	+8	+7	+3	+9	+7	+4	+4	+6	+11	+5	+7	+5
Step[T][S]Sparse	+20	+18	+21	+24	+20	+9	+15	+14	+17	+18	+17	+14
[T]Alt	+4	-8	+1	+9	+6	+9	+9	-5	-8	-7	+3	-10
[T][S]	+9	+12	+11	+10	+10	+4	+10	+3	+9	+10	+8	+7
[T][S][FP]	+10	+9	+10	+9	+8	+5	+7	+5	+11	+7	+9	+7
[T][S][HP]	+10	+9	+9	+13	+8	+5	+8	+4	+11	+10	+8	+7
[T][S][HP]Async	+10	+11	+6	+12	+8	+5	+11	+3	+8	+8	+9	+3
[T][S][L]	+7	+9	+9	+9	+6	+3	+8	+6	+5	+2	+5	+3
[T][S][L]Cache	+7	+12	+5	+6	+7	+3	+7	+3	+5	+6	+7	+8
[T][S]Sparse	+20	+16	+18	+19	+20	+8	+16	+14	+22	+16	+22	+16
step_sgd	+2	+1	+0	+5	+1	+1	+3	+3	+6	+1	-1	-2
step_tween	+3	-1	-1	+6	+5	+2	+4	-1	+0	+1	-2	-4
step_tween_chain	+4	+5	+3	+4	+2	+2	+0	+5	-1	-1	+0	+0
tween	+0	+2	-2	+3	+1	+3	+3	+1	+0	-1	-4	-6
tween_chain	+0	+2	+2	+1	-2	+1	-0	+1	+3	-2	-2	-2

AvailD vs sgd, every mode x dtype (cols 13-24)

AvailD vs sgd, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	+4	+1	+1	+1	+4	+3	-2	+2	+3	+3	+2	+4
Mesh[T]	+17	+25	+14	+16	+20	+18	+17	+14	+13	+15	+17	+10
Mesh[T]Alt	-7	-8	-5	-6	-4	-6	-11	-5	-4	-5	-10	-6
Mesh[T]Chain	-2	-6	-5	-2	-2	+2	-2	+2	-1	-0	-2	-4
Mesh[T][S]	+7	+1	+8	+9	+5	+10	+7	+8	+4	+7	+7	+8
Mesh[T][S][FP]	+7	+4	+4	+7	+9	+11	+7	+10	+9	+1	+6	+10
Mesh[T][S]Sparse	+21	+11	+16	+17	+16	+19	+18	+15	+22	+15	+17	+21
Step[T]Alt	-6	-7	-6	-4	-6	-6	-7	-6	-5	-4	-6	-5
Step[T][S]	+9	+3	+7	+10	+9	+8	+5	+8	+11	+3	+9	+9
Step[T][S][FP]	+9	+6	+6	+10	+9	+14	+9	+8	+9	+6	+8	+10
Step[T][S][HP]	+10	+1	+5	+12	+10	+11	+8	+8	+8	+2	+10	+9
Step[T][S][HP]Async	+4	+4	+6	+9	+10	+6	+6	+7	+5	+2	+6	+7
Step[T][S][L]	+7	+2	+4	+9	+7	+4	+1	+6	+6	+1	+5	+4
Step[T][S][L]Cache	+6	+4	+9	+10	+6	+14	+2	+11	+6	+6	+9	+11
Step[T][S]Sparse	+19	+8	+20	+16	+20	+21	+14	+17	+17	+8	+20	+20
[T]Alt	-5	-7	-8	-6	-8	-8	-7	-8	-5	-8	-10	-6
[T][S]	+8	+4	+9	+7	+6	+10	+4	+5	+9	+2	+9	+6
[T][S][FP]	+10	+3	+5	+9	+8	+8	+5	+10	+11	+6	+6	+11
[T][S][HP]	+8	+4	+2	+9	+10	+8	+10	+7	+11	+10	+5	+11
[T][S][HP]Async	+8	+4	+7	+5	+6	+9	+2	+9	+8	+3	+4	+7
[T][S][L]	+6	+4	+5	+9	+4	+7	+4	+8	+5	+6	+5	+5
[T][S][L]Cache	+8	+3	+6	+8	+6	+5	+4	+9	+11	+9	+6	+6
[T][S]Sparse	+20	+11	+17	+19	+17	+19	+17	+19	+18	+13	+17	+23
step_sgd	+2	+0	+4	+1	+1	+2	-0	+5	-0	-1	-1	+5
step_tween	+0	-4	-1	+4	-1	+1	+1	-1	+1	-1	-2	+4
step_tween_chain	-0	-4	+4	+2	+1	+5	+4	-1	+5	-2	-1	+4
tween	-1	-5	-2	-0	+1	-1	-2	+2	-1	-2	-2	+1
tween_chain	-0	-2	-1	-2	+0	-0	-7	-1	+1	-5	-2	+1

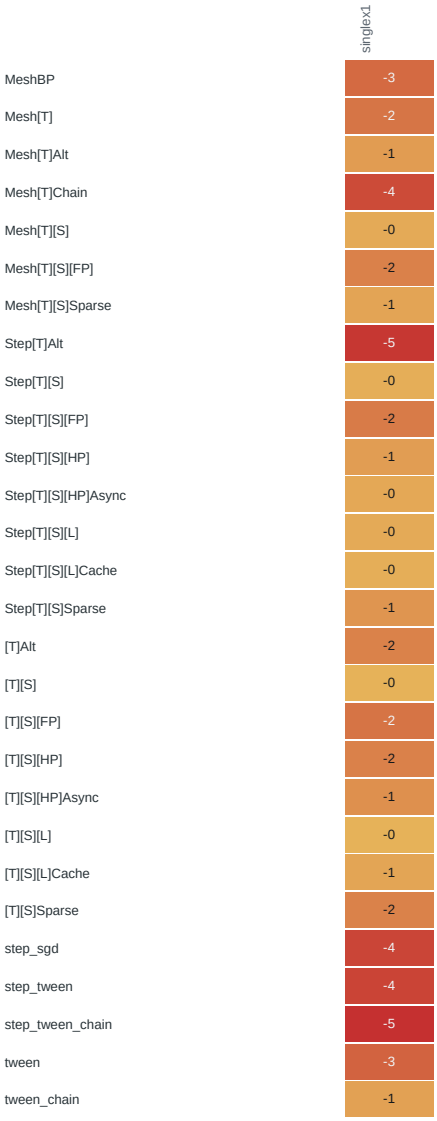
AvailD vs sgd, every mode x dtype (cols 25-34)

AvailD vs sgd, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	+1	+2	+1	+3	+3	+5	+1	+2	+0	+3
Mesh[T]	+16	+18	+18	+13	+16	+20	+15	+14	+13	+11
Mesh[T]Alt	-6	-5	-6	-4	-9	-6	-8	-10	-11	-8
Mesh[T]Chain	-1	-2	+1	-4	-2	-3	-4	+0	-6	-1
Mesh[T][S]	+10	+3	+8	+6	+5	+11	+10	+6	+8	+8
Mesh[T][S][FP]	+8	+5	+12	+8	+13	+5	+7	+10	+7	+9
Mesh[T][S]Sparse	+22	+15	+17	+22	+22	+18	+20	+17	+17	+21
Step[T]Alt	-3	-4	-4	-4	-4	-6	-5	-6	-6	-5
Step[T][S]	+8	+4	+10	+9	+9	+6	+10	+6	+7	+11
Step[T][S][FP]	+9	+7	+9	+5	+8	+10	+10	+8	+8	+8
Step[T][S][HP]	+8	+5	+10	+8	+10	+9	+9	+5	+8	+10
Step[T][S][HP]Async	+6	+8	+9	+7	+6	+4	+7	+4	+5	+9
Step[T][S][L]	+12	+2	+3	+4	+10	+3	+6	+6	+2	+5
Step[T][S][L]Cache	+9	+6	+8	+9	+10	+10	+6	+6	+6	+8
Step[T][S]Sparse	+21	+14	+20	+18	+17	+21	+16	+17	+18	+20
[T]Alt	-6	-5	-6	-6	-8	-6	-8	-10	-11	-7
[T][S]	+9	+7	+10	+9	+7	+12	+10	+8	+6	+9
[T][S][FP]	+10	+6	+9	+10	+9	+11	+10	+7	+7	+11
[T][S][HP]	+10	+3	+8	+9	+8	+13	+17	+8	+7	+10
[T][S][HP]Async	+8	+5	+8	+7	+5	+3	+8	+4	+7	+9
[T][S][L]	+4	+8	+7	+5	+9	+7	+3	+4	+2	+7
[T][S][L]Cache	+10	+4	+9	+9	+6	+8	+4	+3	+6	+8
[T][S]Sparse	+20	+17	+20	+19	+19	+16	+18	+20	+15	+17
step_sgd	+4	+3	+5	+3	+4	+2	+0	+0	+1	+3
step_tween	+1	+0	+3	+1	+3	-0	-1	-1	+0	+4
step_tween_chain	+2	+0	+4	+2	+1	+3	+5	+0	+2	+3
tween	+1	-1	-2	+1	+1	+1	-1	-5	-1	+1
tween_chain	+3	+1	+2	-2	-1	+2	+0	-4	-1	-0

AccD vs sgd, every mode x arch

AccD vs sgd, every mode x arch



Family collapse - Step* vs non-Step

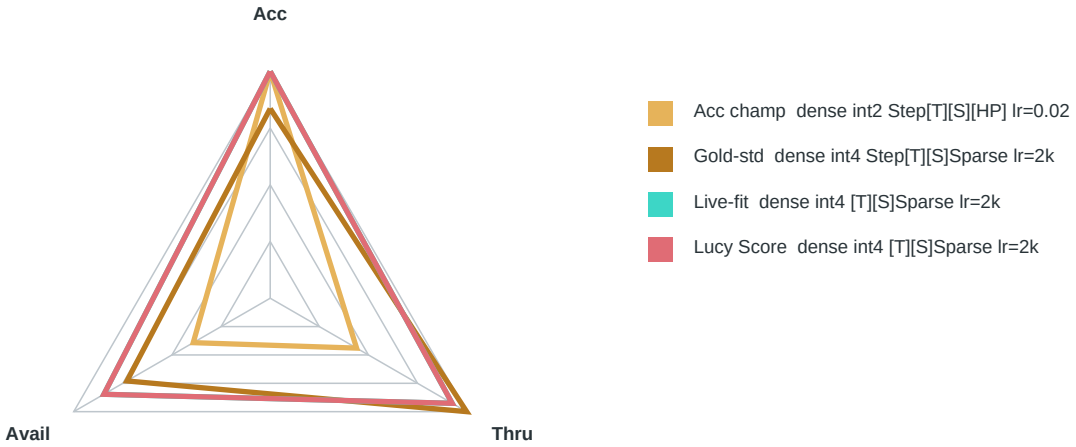
Step* is a 1D pipe (one sample enters layer 0 per tick; output is the sample that entered depth ticks ago). Non-Step of the same family is a full-chain update. AccD is a real scheduler split, not leftover warm-up forwards.

step	plain	n	mean |AccD|
Step[T]Alt	[T]Alt	34	8.64
Step[T][S]	[T][S]	34	5.84
Step[T][S][FP]	[T][S][FP]	34	4.74
Step[T][S][HP]	[T][S][HP]	34	3.73
Step[T][S][HP]Async	[T][S][HP]Async	34	5.46
Step[T][S][L]	[T][S][L]	34	3.91
Step[T][S][L]Cache	[T][S][L]Cache	34	2.67
Step[T][S]Sparse	[T][S]Sparse	34	3.93
step_sgd	sgd	34	5.38
step_tween	tween	34	6.24
step_tween_chain	tween_chain	34	6.46

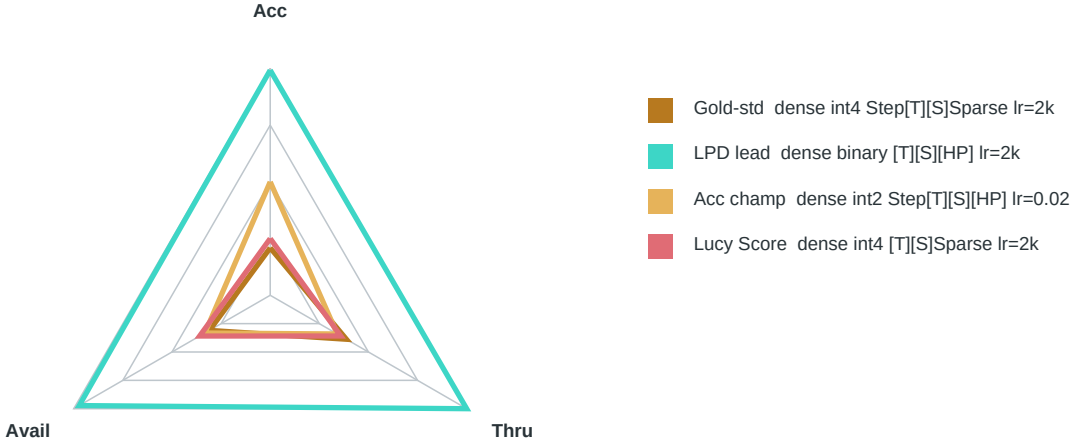
Consciousness - Acc, Throughput, Availability

Synthetic organism / Lucy density: can the net run and train at the same time in a small box. Lucy Score = Throughput x Availability x Acc / 10,000 (hard Acc; SoftAcc is serve-confidence only). SGD that blocks serve dies on Availability. Q = geomean Acc/Thru/Avail vs learner peaks (traps do not set Thru/Avail). LPD = Q x shrink vs Acc-champ RAM; 0 unless Acc keep >=70%. Gold = all 3 pillars >=80% at <=20% Acc-champ RAM. Gold-std = Acc >=80% plus Thru or Avail, then smallest then fastest. Score/MiB is the binary trap.
Acc champ dense|int2|Step[T][S][HP]|lr=0.02 Acc 50.0 Thru 10747 Avail 18.4% 0.5 KiB (RAM reference)
Lucy Score champ (T x Avail x Acc) dense|int4|[T][S]Sparse|lr=2k Score 4489.9 Acc 50.0 Soft 2 1.0 KiB
Live-fit champ (best Q) dense|int4|[T][S]Sparse|lr=2k Acc 50.0 Thru 22636 Avail 39.7% 1.0 KiB
Gold-std (2+ pillars, Acc keep >= 80%, then smallest then fastest): dense|int4|Step[T][S]Sparse|lr=2k mode Step[T][S]Sparse Acc 41.8 Thru 24440 1.0 KiB
Board fastest dense|float32|[T]Alt|lr=2 Thru 74083 (traps may own this) Best availability dense|fp6|Mesh[T][S]Sparse|lr=200 57.3%
Learner Thru peak 24440 learner Avail peak 46.9%

Consciousness radar - Acc / Thru / Avail vs learner peaks



Memory density radar - same pillars x shrink vs Acc champ (traps sit at origin)



No gold cell yet. Need all three pillars at 80% of learner peaks in one fifth of Acc-champ RAM.

Gold-standard train modes - 2+ pillars, Acc keep >= 80%, smallest then fastest

Mode	n	Acc	KiB	Thru	Cell
Step[T][S]Sparse	2	50.0	1.0	24440	dense int4 Step[T][S]Sparse lr=2k
[T][S]Sparse	2	50.0	1.0	22636	dense int4 [T][S]Sparse lr=2k

Mode	n	Acc	KiB	Thru	Cell
Mesh[T][S]Sparse	2	50.0	1.5	22618	dense uint6 Mesh[T][S]Sparse lr=2k / dense int32 Mesh[T][S]Sparse~

Lucy density (LPD) - Q x shrink vs Acc-champ RAM; 0 if Acc keep < 70%

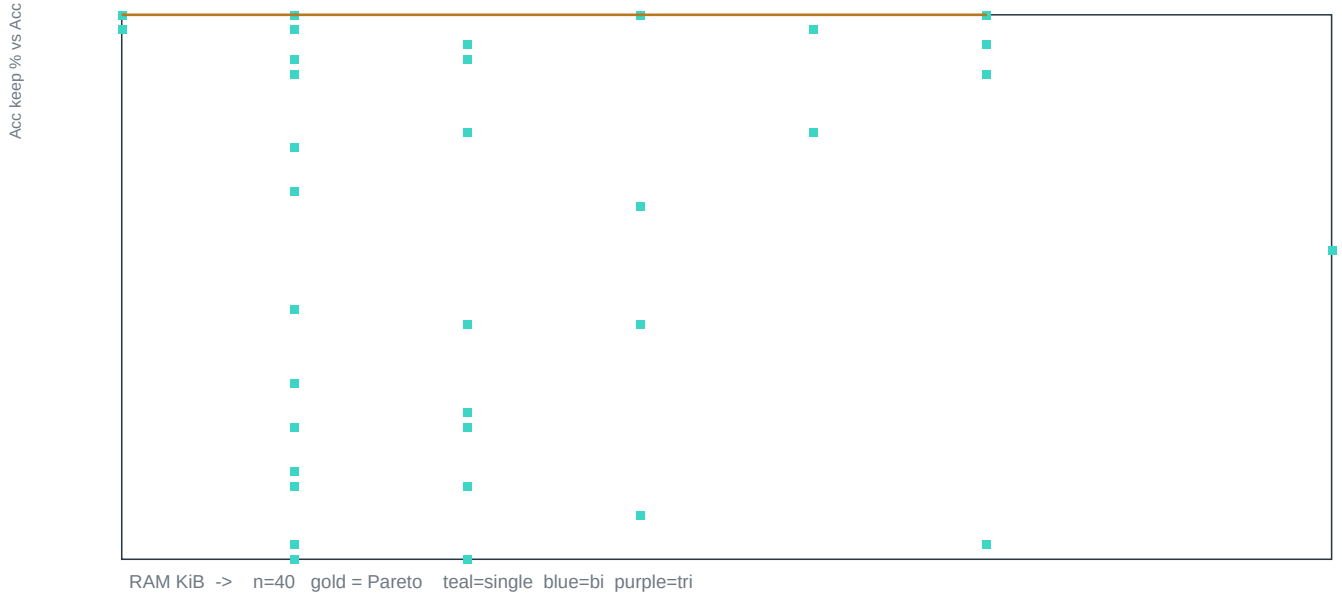
Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
acc	dense binary [T][S][HP] lr=2k	99	64	57	72	50	2.0	1.43	49.6	15756	0.2
acc	dense binary Mesh[T][S] lr=2k	100	60	59	71	50	2.0	1.42	50.0	14693	0.2
acc	dense binary Step[T][S][L] lr=2	100	58	58	70	50	2.0	1.39	50.0	14134	0.2
acc	dense uint2 Step[T][S]Sparse lr=2k	100	76	67	80	100	1.0	0.80	50.0	18464	0.5
-	dense ternary Mesh[T][S]Sparse lr=200	71	87	72	76	100	1.0	0.76	35.5	21299	0.5
acc	dense ternary [T][S][L] lr=0.02	100	60	62	72	100	1.0	0.72	50.0	14738	0.5
acc	dense ternary Step[T][S] lr=2	99	67	51	70	100	1.0	0.70	49.6	16394	0.5
-	dense ternary [T][S] lr=0.02	76	76	59	70	100	1.0	0.70	37.9	18666	0.5
acc	dense uint2 [T][S] lr=2k	91	50	52	62	100	1.0	0.62	45.3	12264	0.5
acc	dense int2 Step[T][S][HP] lr=0.02	100	44	39	56	100	1.0	0.56	50.0	10747	0.5
acc	dense int2 Step[T][S][HP] lr=2	98	44	37	54	100	1.0	0.54	48.8	10827	0.5
-	dense int2 Step[T][S] lr=0.02	78	50	40	54	100	1.0	0.54	39.1	12144	0.5
acc	dense uint2 Step[T][S][L]Cache lr=0.02	80	48	38	53	100	1.0	0.53	40.2	11688	0.5
acc	dense ternary [T] lr=200	93	33	45	52	100	1.0	0.52	46.5	8075	0.5
acc	dense uint2 Step[T] lr=0.02	100	36	34	50	100	1.0	0.50	50.0	8877	0.5
acc	dense uint2 Mesh[T][S] lr=2	84	39	37	50	100	1.0	0.50	42.2	9506	0.5
keep	dense int4 [T][S]Sparse lr=2k	100	93	85	92	200	0.5	0.46	50.0	22636	1.0
-	dense uint3 [T][S]Sparse lr=2k	79	42	95	68	150	0.7	0.45	39.5	10224	0.7
keep	dense int4 Step[T][S]Sparse lr=2k	84	100	73	85	200	0.5	0.42	41.8	24440	1.0
-	dense uint2 [T]Chain lr=0.02	72	34	26	40	100	1.0	0.40	35.9	8232	0.5

Consciousness rank - Q = geomean Acc/Thru/Avail keep

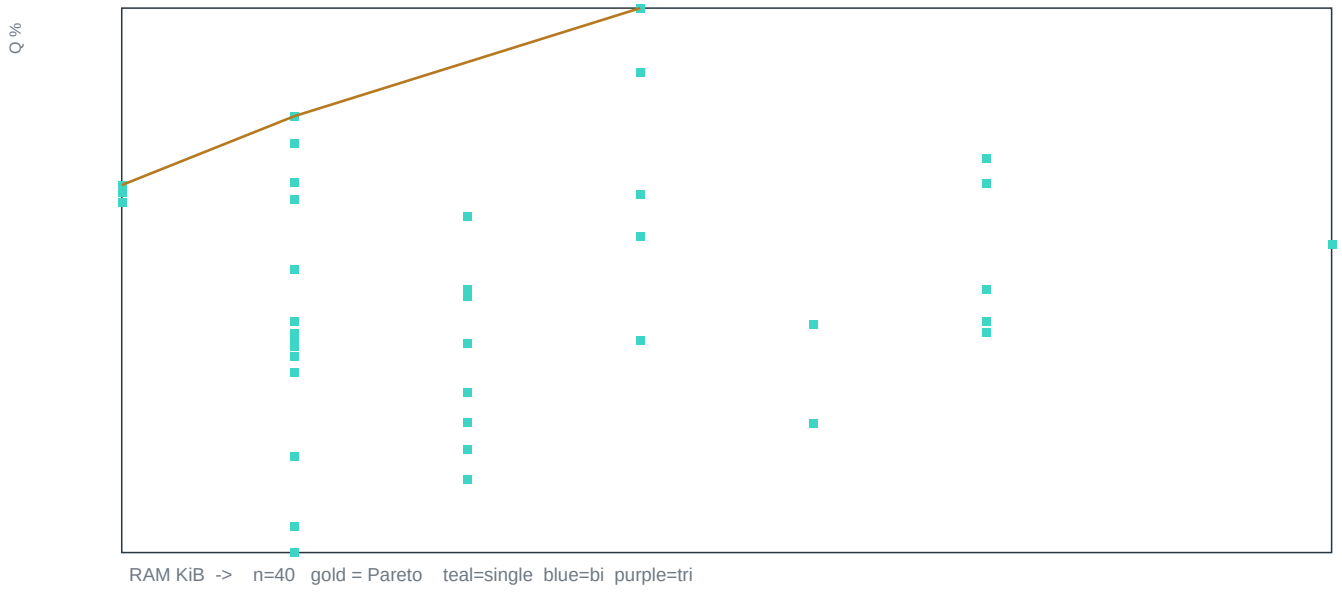
Band	Cell	Acc%	Thru%	Avail%	Q%	LPD	Thru	Avail
keep	dense int4 [T][S]Sparse lr=2k	100	93	85	92	0.46	22636	39.7
keep	dense int16 Step[T][S]Sparse lr=2k	100	96	76	90	0.11	23463	35.8
keep	dense int32 Mesh[T][S]Sparse lr=2k	100	93	77	89	0.06	22618	36.1
keep	dense int4 Step[T][S]Sparse lr=2k	84	100	73	85	0.42	24440	34.2
acc	dense uint2 Step[T][S]Sparse lr=2k	100	76	67	80	0.80	18464	31.3
-	dense ternary Mesh[T][S]Sparse lr=200	71	87	72	76	0.76	21299	33.8
keep	dense uint6 [T][S]Sparse lr=0.02	98	51	83	75	0.25	12375	39.1
acc	dense int16 Step[T][S] lr=0.02	100	80	51	74	0.09	19538	24.1
acc	dense int32 Mesh[T][S] lr=0.02	93	76	54	72	0.05	18661	25.1
acc	dense ternary [T][S][L] lr=0.02	100	60	62	72	0.72	14738	28.8

Acc keep % vs RAM KiB (gold = high Acc, low RAM vs Acc champ)

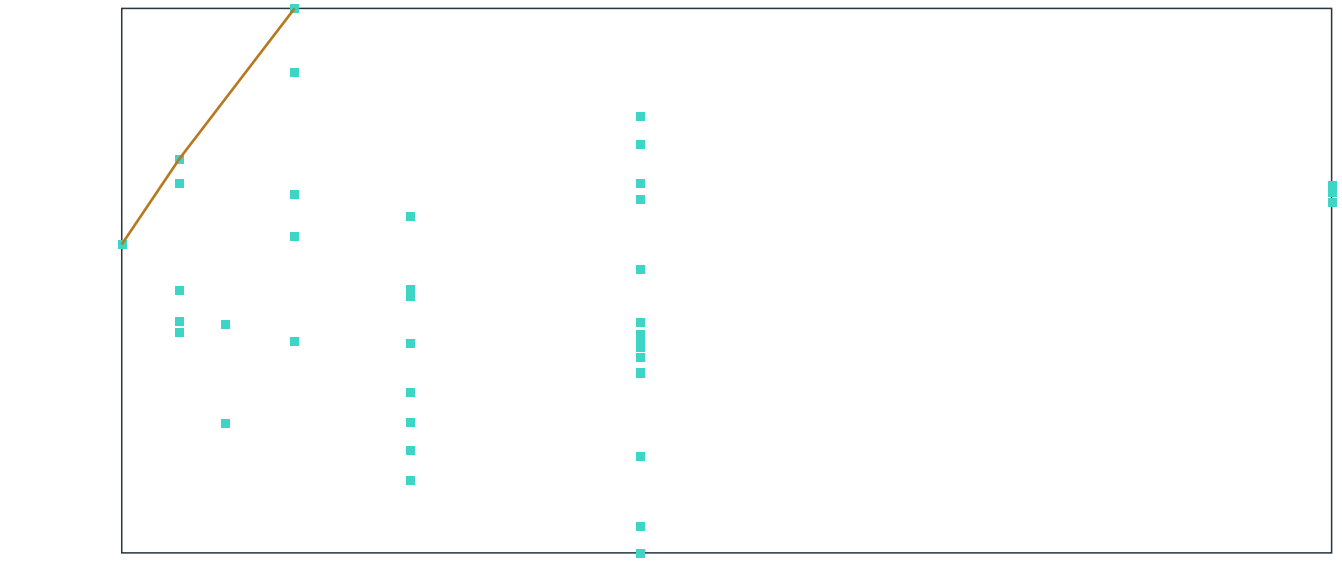
Acc keep % vs RAM KiB (gold = high Acc, low RAM vs Acc champ)



Q% vs RAM KiB (gold = high consciousness, low RAM)



Q% vs shrink vs Acc champ (gold = upper right)



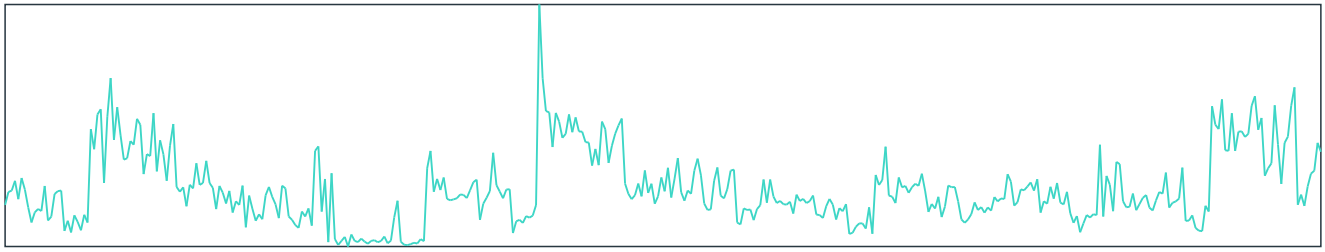
times smaller than Acc champ -> n=40 gold = Pareto teal=single blue=bi purple=tri

Q %

Top Lucy density (LPD)

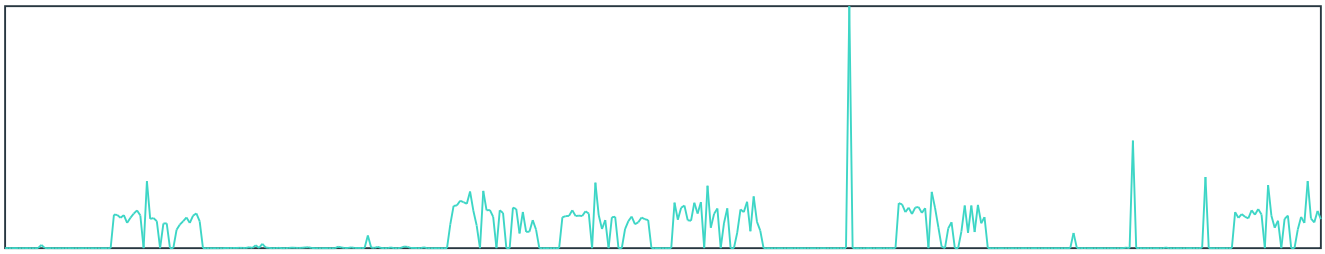


Live pulse (Score)



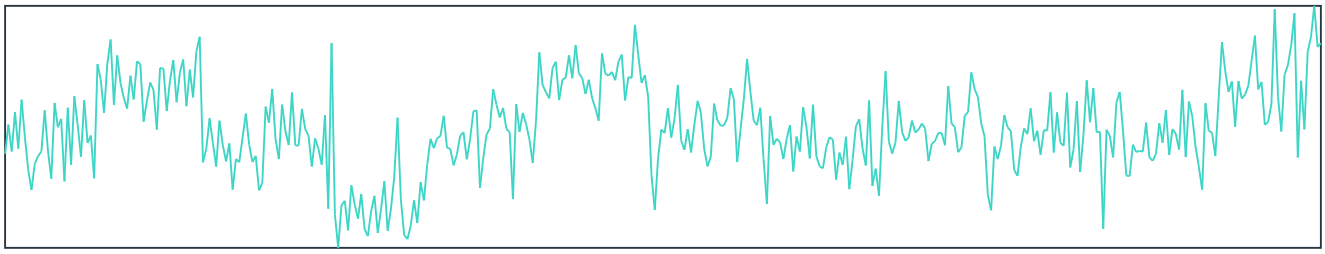
n=400 min=1.20 max=3773.31

Live pulse (SoftAcc)



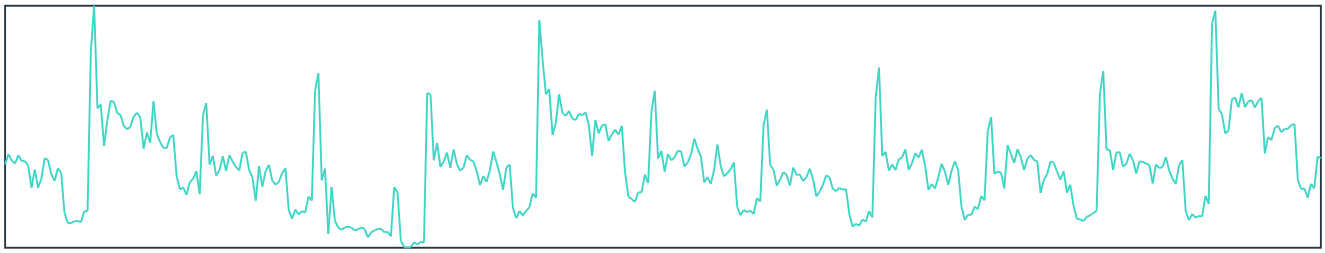
n=400 min=0.00 max=13.67

Live pulse (Availability)



n=400 min=3.00 max=50.58

Live pulse (Throughput)



n=400 min=2037.37 max=38973.89

Queue by train mode (this epoch)

Mode	Done	Run	Left	Total
sgd	136	0	0	136
step_sgd	136	0	0	136
tween	136	0	0	136
tween_chain	136	0	0	136
step_tween	136	0	0	136
step_tween_chain	136	0	0	136
MeshBP	136	0	0	136
Mesh[T]	136	0	0	136
Mesh[T]Chain	136	0	0	136
[T][S]	136	0	0	136
Step[T][S]	136	0	0	136
[T]Alt	136	0	0	136
Step[T]Alt	136	0	0	136
[T][S][HP]	136	0	0	136
[T][S][L]	136	0	0	136
[T][S][FP]	136	0	0	136
[T][S][L]Cache	136	0	0	136
[T][S][HP]Async	136	0	0	136
[T][S]Sparse	136	0	0	136
Mesh[T][S]	136	0	0	136
Mesh[T]Alt	136	0	0	136
Mesh[T][S][FP]	136	0	0	136
Mesh[T][S]Sparse	136	0	0	136
Step[T][S][HP]	136	0	0	136
Step[T][S][L]	136	0	0	136
Step[T][S][FP]	136	0	0	136
Step[T][S][L]Cache	136	0	0	136
Step[T][S][HP]Async	136	0	0	136
Step[T][S]Sparse	136	0	0	136