tmLQCD HMC profile

n16_cA211.08.64_therm_m100

2022-07-06

Contents

Table 1: Total time per monomial. Percentages are w.r.t. to the total time of 24055.5 seconds.

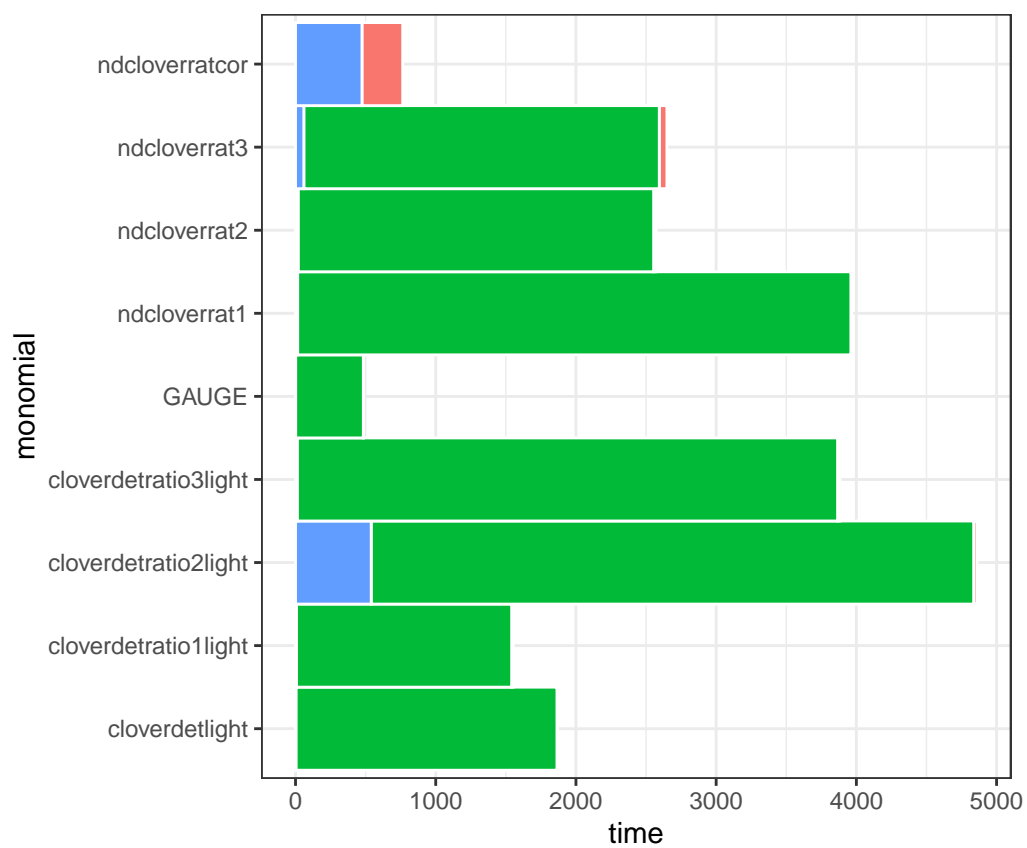| monomial	time	invocations	unit_time	prop
cloverdetratio2light	4860.2	114	42.6	20.2
ndcloverrat1	3967.5	438	9.1	16.5
cloverdetratio3light	3883.3	114	34.1	16.1
ndcloverrat3	2648.7	114	23.2	11.0
ndcloverrat2	2571.4	222	11.6	10.7
cloverdetlight	1869.1	438	4.3	7.8
cloverdetratio1light	1553.1	222	7.0	6.5
ndcloverratcor	764.3	4	191.1	3.2
GAUGE	484.6	870	0.6	2.0
other and unaccounted for	1453.4	NA	NA	6.0

Total time per monomial
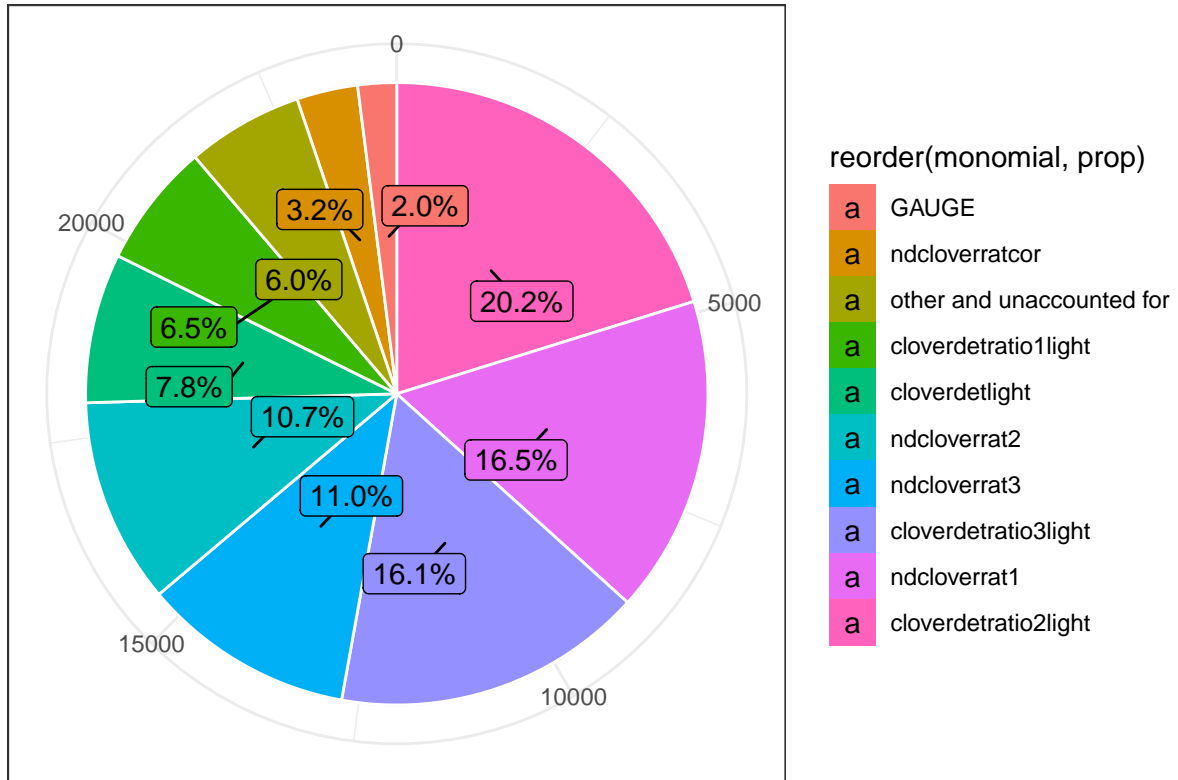
Hotspots by level

The total time spent in the benchmark was 2.405553×10^4 seconds. All percentages in the plot below are with respect to this total time.

time

cloverdetratio_derivative 9686.4 s (40.3 %)	**ndrat_derivative** 9015.9 s (37.5 %) **1**
	cloverdet_derivative 1861.5 s (7.7 %)

invert_eo_degenerate_quda 9218.7 s (38.3 %) **3**

solve_mms_nd 827.6 s (3.4 %)

solve_degenerate 9222.4 s (38.3 %)

solve_mms_nd 4087.2 s (17.0 %) **2**

deriv_Sb 1422.0 s (5.9 %)

sw_term 931.0 s (3.9 %)

apply_Z_ndpsi 757.9 s (3.2 %)

sw_all 3172.4 s (13.2 %)

invertQuda 6182.9 s (25.7 %) **4**

invertMultiShiftQuda 3668.3 s (15.2 %)

5
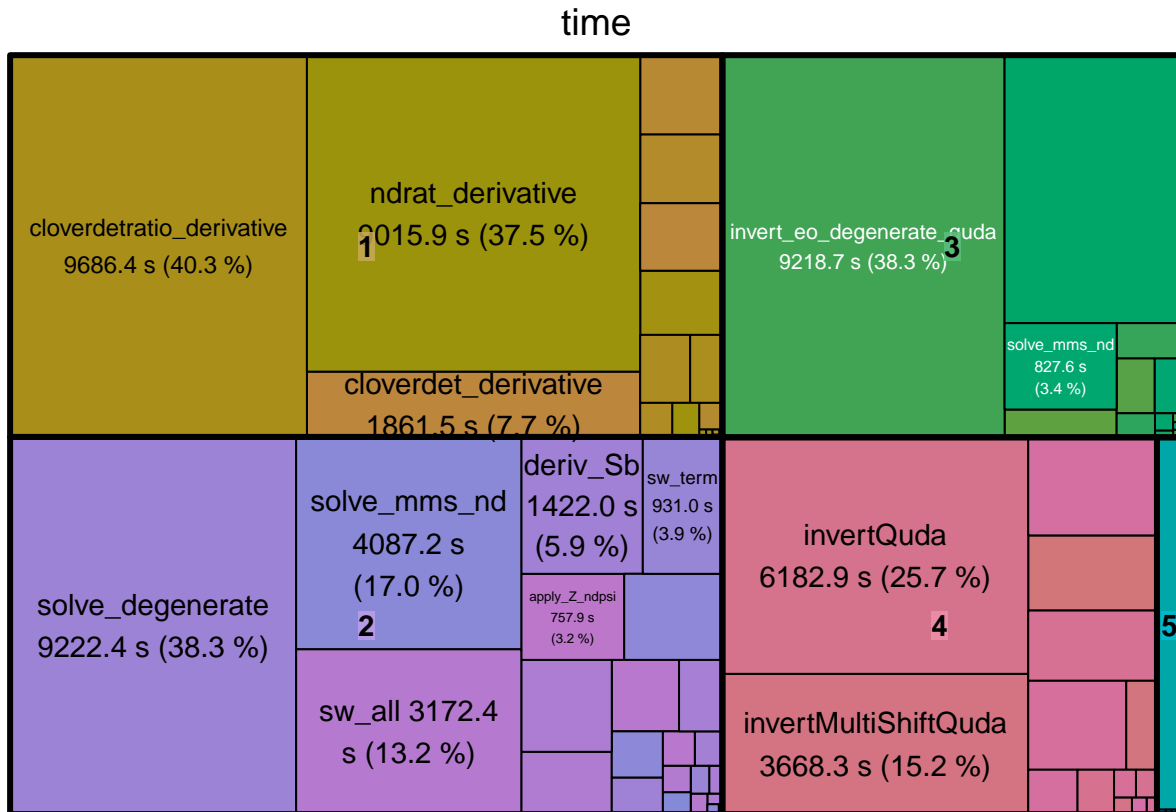
Time by type and monomial

monomial	type	time	prop	invocations	unit_time
cloverdetlight	acc	4.5	0.2	2	2.3
cloverdetlight	derivative	1861.5	99.6	434	4.3
cloverdetlight	heatbath	3.0	0.2	2	1.5
cloverdetratio1light	acc	11.7	0.8	2	5.8
cloverdetratio1light	derivative	1535.5	98.9	218	7.0
cloverdetratio1light	heatbath	5.9	0.4	2	3.0
cloverdetratio2light	acc	23.6	0.5	2	11.8
cloverdetratio2light	derivative	4296.9	88.4	110	39.1
cloverdetratio2light	heatbath	539.7	11.1	2	269.9
cloverdetratio3light	acc	17.2	0.4	2	8.6
cloverdetratio3light	derivative	3854.0	99.2	110	35.0
cloverdetratio3light	heatbath	12.1	0.3	2	6.0
GAUGE	acc	1.1	0.2	2	0.6
GAUGE	derivative	482.5	99.6	866	0.6
GAUGE	heatbath	1.0	0.2	2	0.5
ndcloverrat1	acc	6.7	0.2	2	3.4
ndcloverrat1	derivative	3945.5	99.4	434	9.1
ndcloverrat1	heatbath	15.2	0.4	2	7.6
ndcloverrat2	acc	17.5	0.7	2	8.7
ndcloverrat2	derivative	2535.4	98.6	218	11.6
ndcloverrat2	heatbath	18.5	0.7	2	9.3
ndcloverrat3	acc	54.4	2.1	2	27.2
ndcloverrat3	derivative	2535.0	95.7	110	23.0
ndcloverrat3	heatbath	59.3	2.2	2	29.7
ndcloverratcor	acc	290.3	38.0	2	145.2
ndcloverratcor	heatbath	473.9	62.0	2	237.0

Table 2: Time spent in different QUDA regions. Compare to total time of 24055.5 seconds.

name	time	prop
download	216.3	1.5
upload	113.4	0.8
init	855.0	5.9
preamble	2693.4	18.7
compute	10217.0	70.9
comms	147.9	1.0
epilogue	79.9	0.6
free	93.0	0.6

overall QUDA profile

The time spent in QUDA is 14415.9 seconds out of a total of 24055.5 seconds (59.9 %).
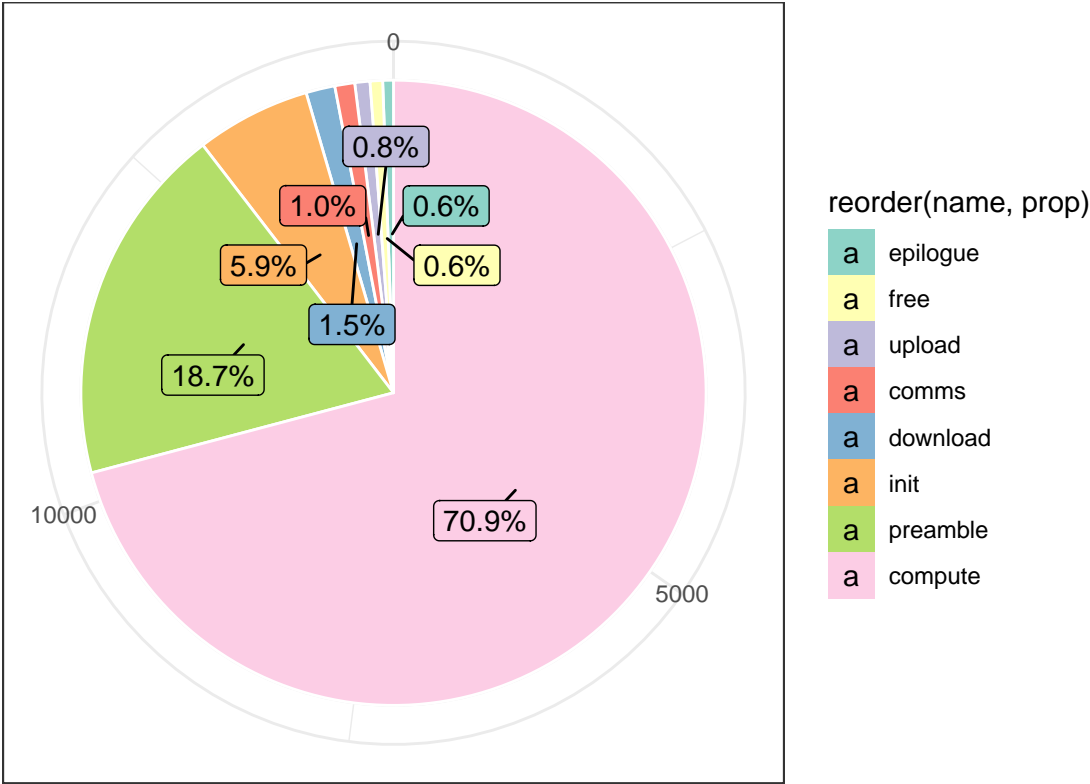
Details by monomial and type

In the tables below, all percentages are given with respect to the given level. The monomials are ordered according to their contribution to the total time.
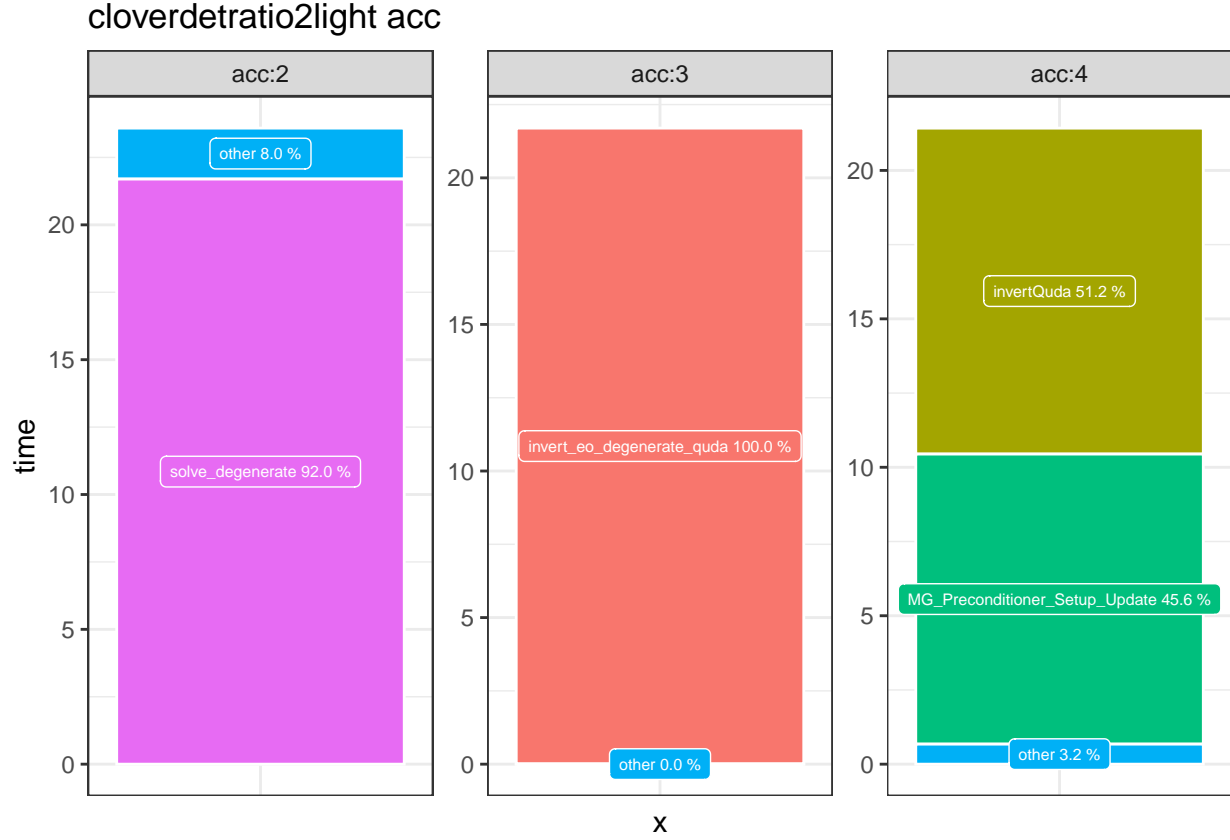
cloverdetratio2light

cloverdetratio2light acc

Table 3: cloverdetratio2light acc

level	name	time	prop	invocations	unit_time
2	other	1.9	8.0	8	0.2
2	solve_degenerate	21.7	92.0	2	10.8
3	invert_eo_degenerate_quda	21.7	100.0	2	10.8
3	other	0.0	0.0	2	0.0
4	invertQuda	11.0	51.2	2	5.5
4	MG_Preconditioner_Setup_Update	9.8	45.6	2	4.9
4	other	0.7	3.2	10	0.1

cloverdetratio2light derivative
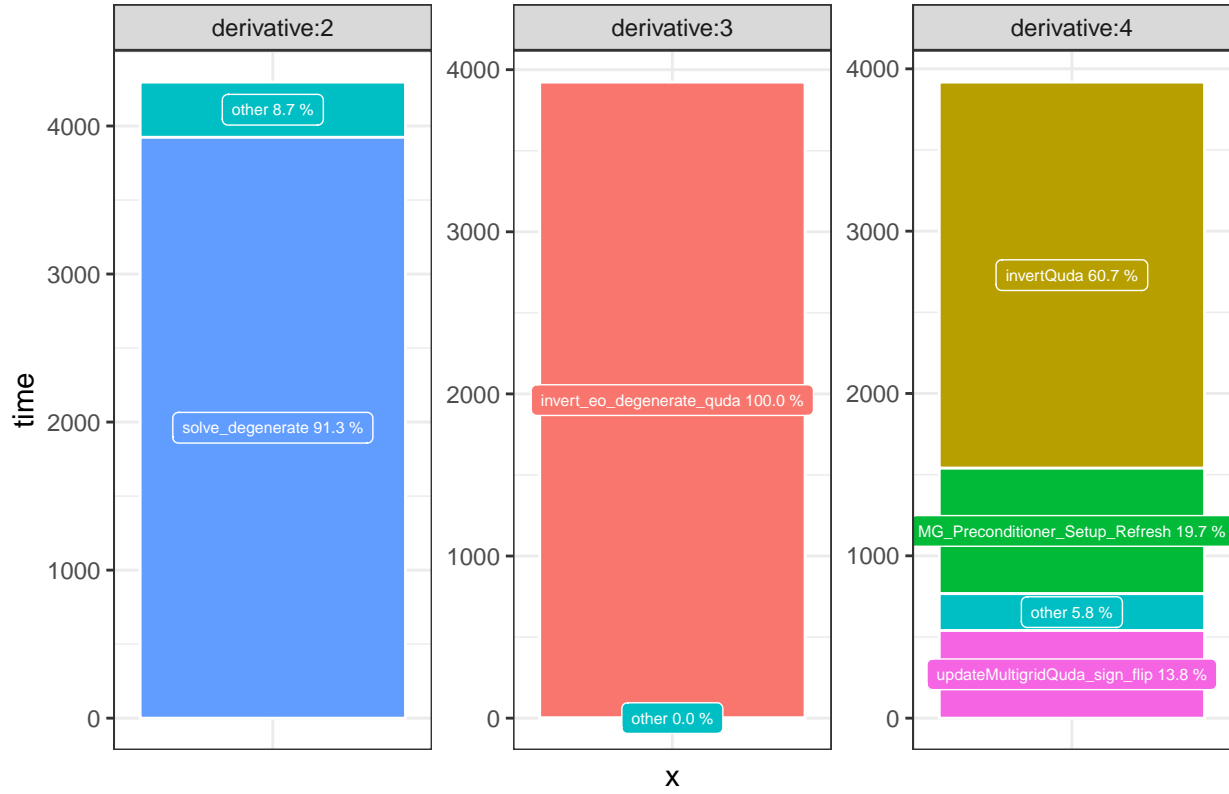
Table 4: cloverdetratio2light derivative

level	name	time	prop	invocations	unit_time
2	other	373.1	8.7	1320	0.3
2	solve_degenerate	3923.5	91.3	110	35.7
3	invert_eo_degenerate_quda	3923.1	100.0	110	35.7
3	other	0.2	0.0	110	0.0
4	invertQuda	2378.4	60.7	220	10.8
4	MG_Preconditioner_Setup_Refresh	773.1	19.7	72	10.7
4	other	226.8	5.8	918	0.2
4	updateMultigridQuda_sign_flip	539.9	13.8	110	4.9

cloverdetratio2light heatbath
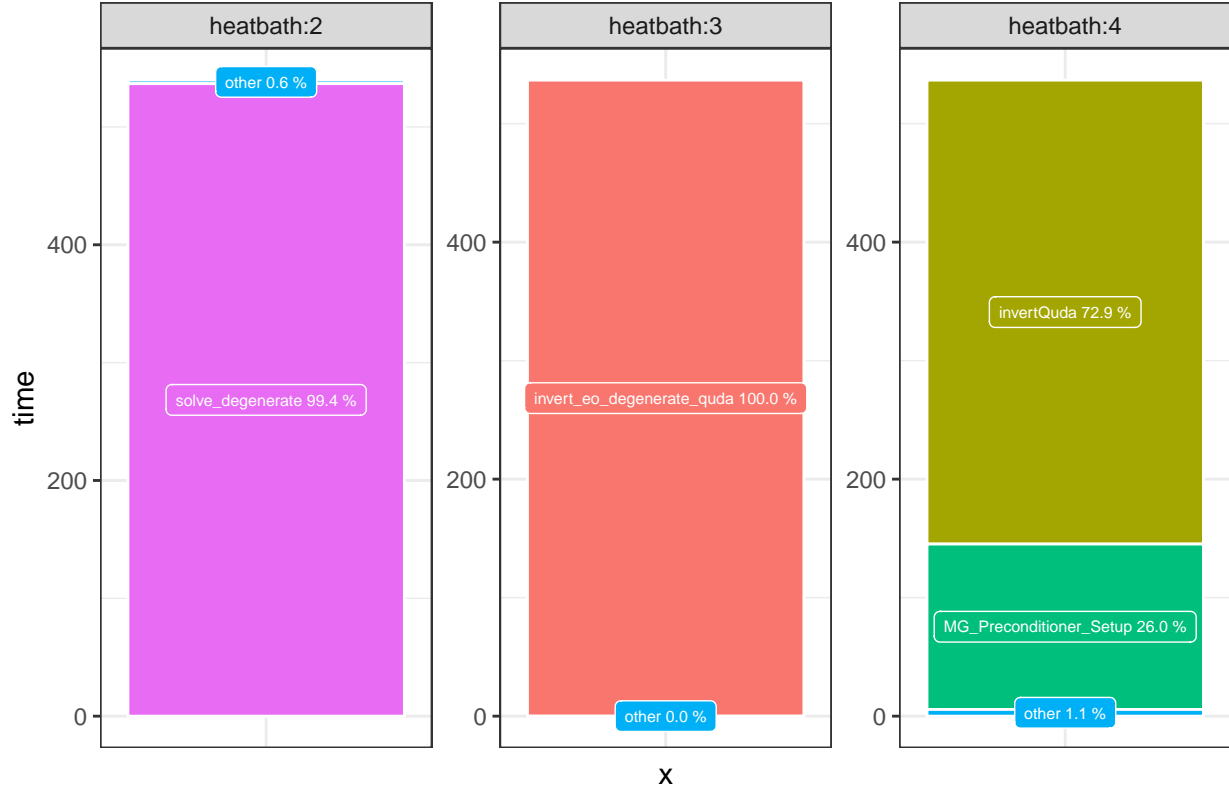
Table 5: cloverdetratio2light heatbath

level	name	time	prop	invocations	unit_time
2	other	3.0	0.6	8	0.4
2	solve_degenerate	536.7	99.4	2	268.4
3	invert_eo_degenerate_quda	536.7	100.0	2	268.4
3	other	0.0	0.0	2	0.0
4	invertQuda	391.5	72.9	2	195.7
4	MG_Preconditioner_Setup	139.6	26.0	1	139.6
4	other	5.7	1.1	11	0.5

ndcloverrat1

ndcloverrat1 acc
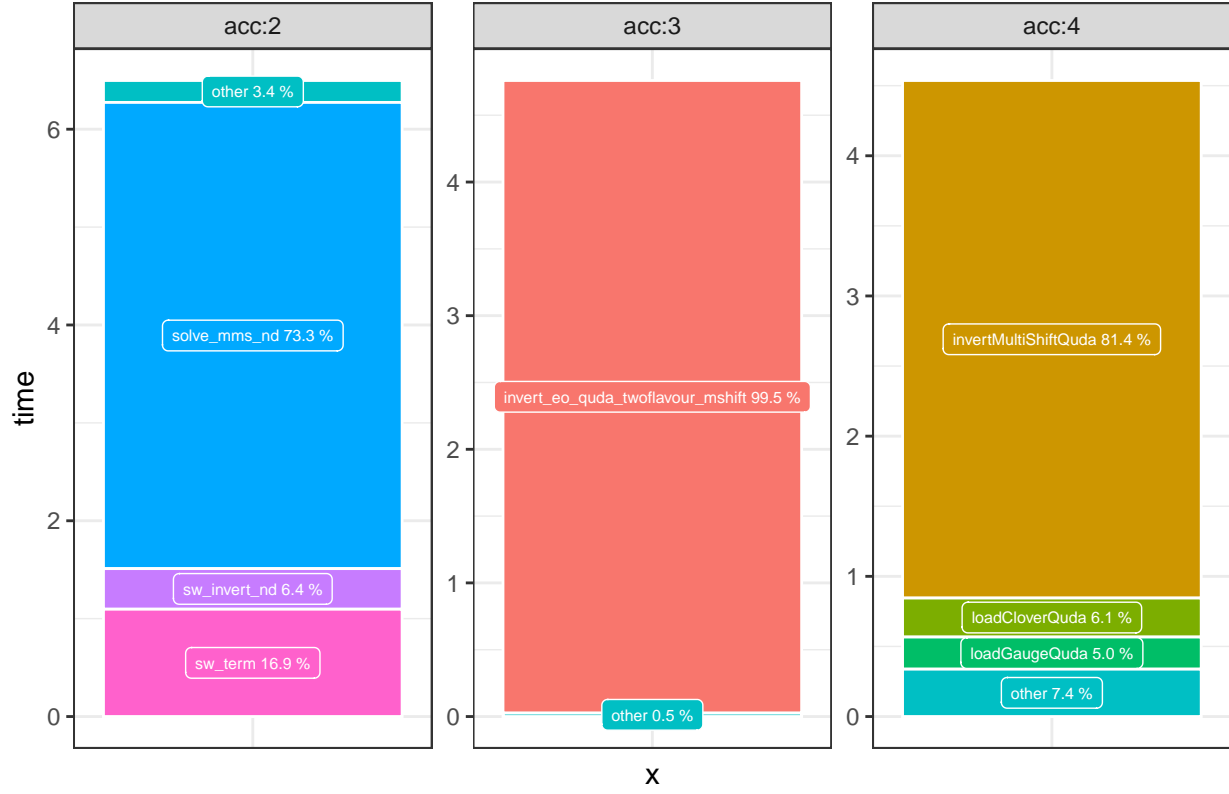
Table 6: ndcloverrat1 acc

level	name	time	prop	invocations	unit_time
2	other	0.2	3.4	2	0.1
2	solve_mms_nd	4.8	73.3	2	2.4
2	sw_invert_nd	0.4	6.4	2	0.2
2	sw_term	1.1	16.9	2	0.5
3	invert_eo_quda_twoflavour_mshift	4.7	99.5	2	2.4
3	other	0.0	0.5	4	0.0
4	invertMultiShiftQuda	3.7	81.4	2	1.8
4	loadCloverQuda	0.3	6.1	2	0.1
4	loadGaugeQuda	0.2	5.0	2	0.1
4	other	0.3	7.4	22	0.0

ndcloverrat1 derivative
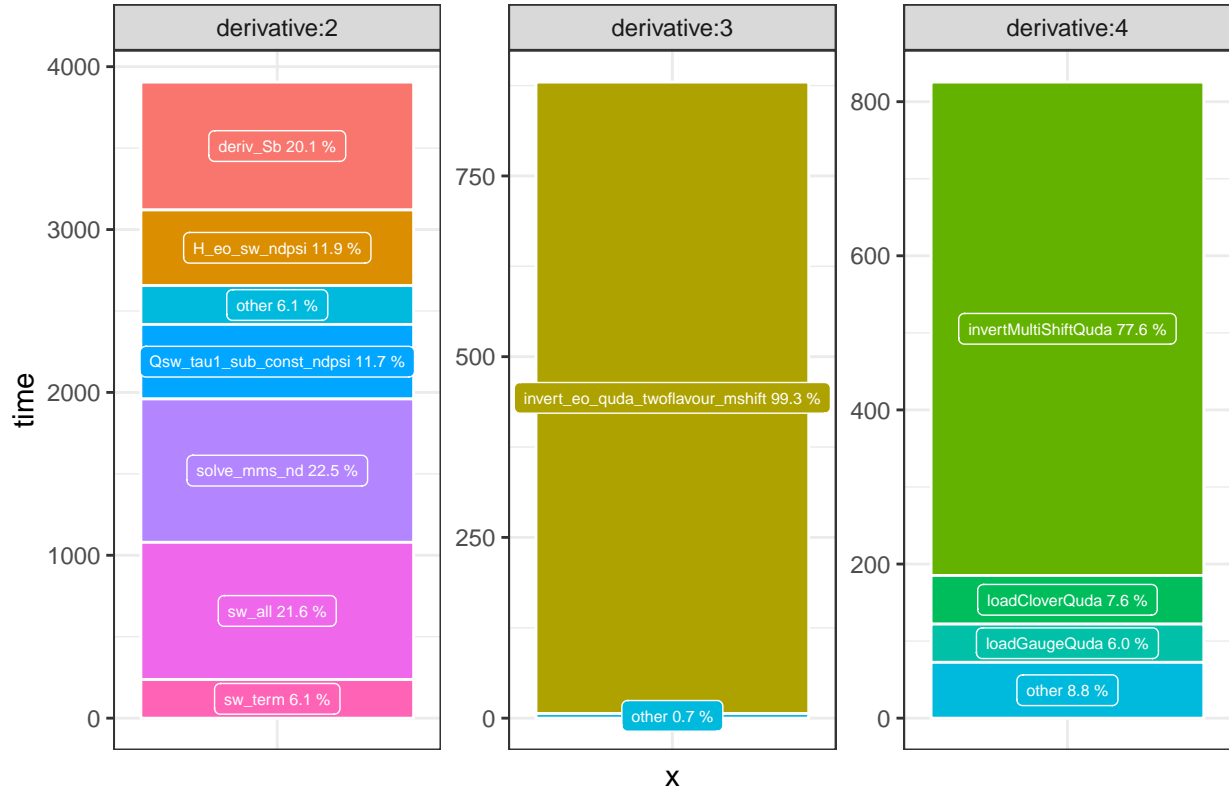
Table 7: ndcloverrat1 derivative

level	name	time	prop	invocations	unit_time
2	deriv_Sb	785.1	20.1	6944	0.1
2	H_eo_sw_ndpsi	464.5	11.9	3472	0.1
2	other	238.2	6.1	8246	0.0
2	Qsw_tau1_sub_const_ndpsi	457.6	11.7	1736	0.3
2	solve_mms_nd	880.4	22.5	434	2.0
2	sw_all	842.5	21.6	434	1.9
2	sw_term	237.1	6.1	434	0.5
3	invert_eo_quda_twoflavour_mshift	873.5	99.3	434	2.0
3	other	6.3	0.7	868	0.0
4	invertMultiShiftQuda	640.3	77.6	434	1.5
4	loadCloverQuda	63.1	7.6	434	0.1
4	loadGaugeQuda	49.6	6.0	434	0.1
4	other	72.4	8.8	4774	0.0

ndcloverrat1 heatbath
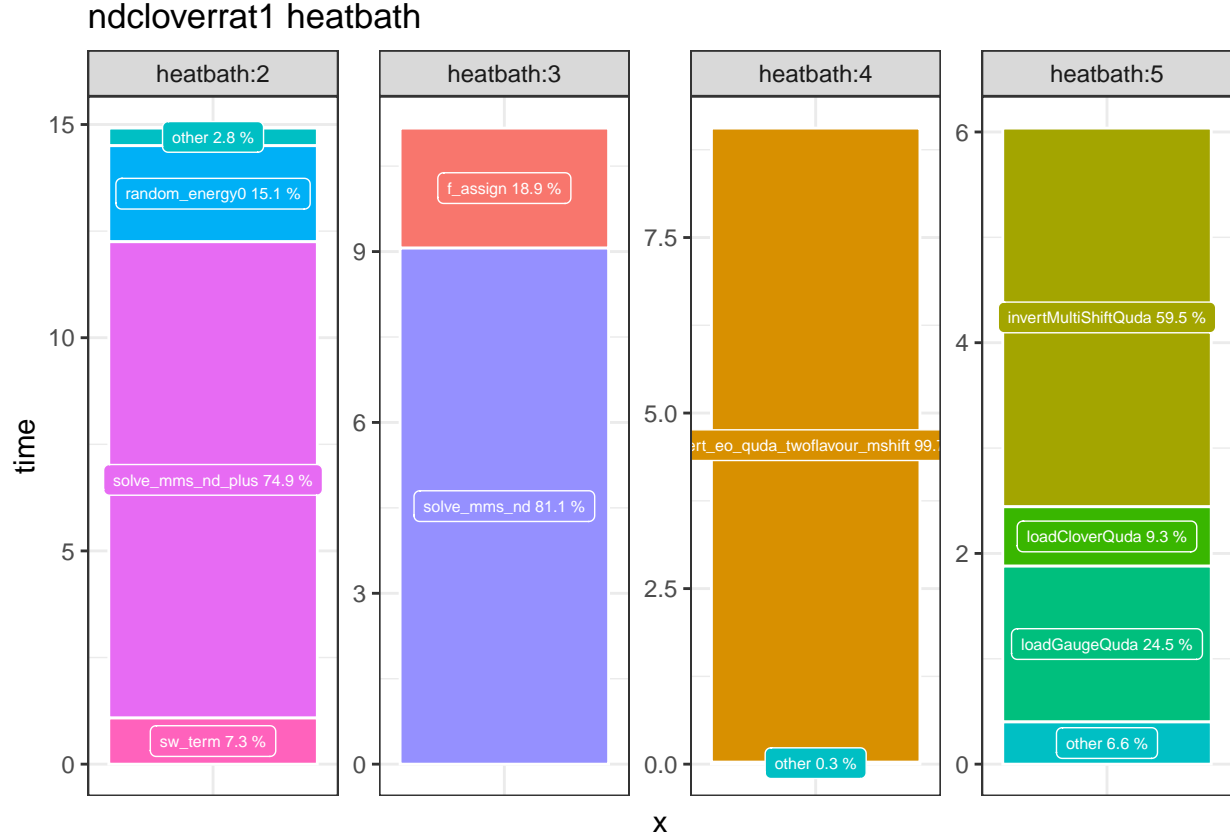
Table 8: ndcloverrat1 heatbath

level	name	time	prop	invocations	unit_time
2	other	0.4	2.8	2	0.2
2	random_energy0	2.3	15.1	2	1.1
2	solve_mms_nd_plus	11.2	74.9	2	5.6
2	sw_term	1.1	7.3	2	0.5
3	f_assign	2.1	18.9	2	1.1
3	solve_mms_nd	9.1	81.1	2	4.5
4	invert_eo_quda_twoflavour_mshift	9.0	99.7	2	4.5
4	other	0.0	0.3	4	0.0
5	invertMultiShiftQuda	3.6	59.5	2	1.8
5	loadCloverQuda	0.6	9.3	2	0.3
5	loadGaugeQuda	1.5	24.5	2	0.7
5	other	0.4	6.6	22	0.0

cloverdetratio3light

cloverdetratio3light acc
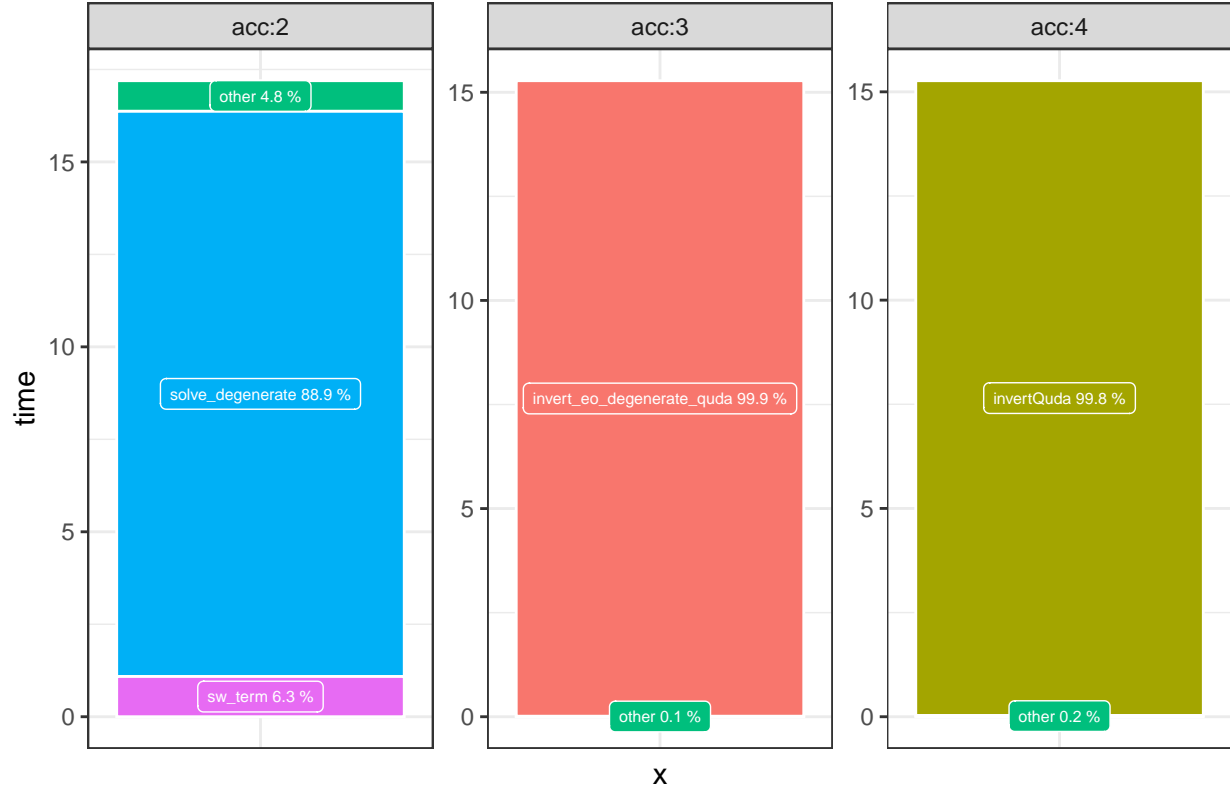
Table 9: cloverdetratio3light acc

level	name	time	prop	invocations	unit_time
2	other	0.8	4.8	6	0.1
2	solve_degenerate	15.3	88.9	2	7.6
2	sw_term	1.1	6.3	2	0.5
3	invert_eo_degenerate_quda	15.3	99.9	2	7.6
3	other	0.0	0.1	2	0.0
4	invertQuda	15.2	99.8	2	7.6
4	other	0.0	0.2	4	0.0

cloverdetratio3light derivative
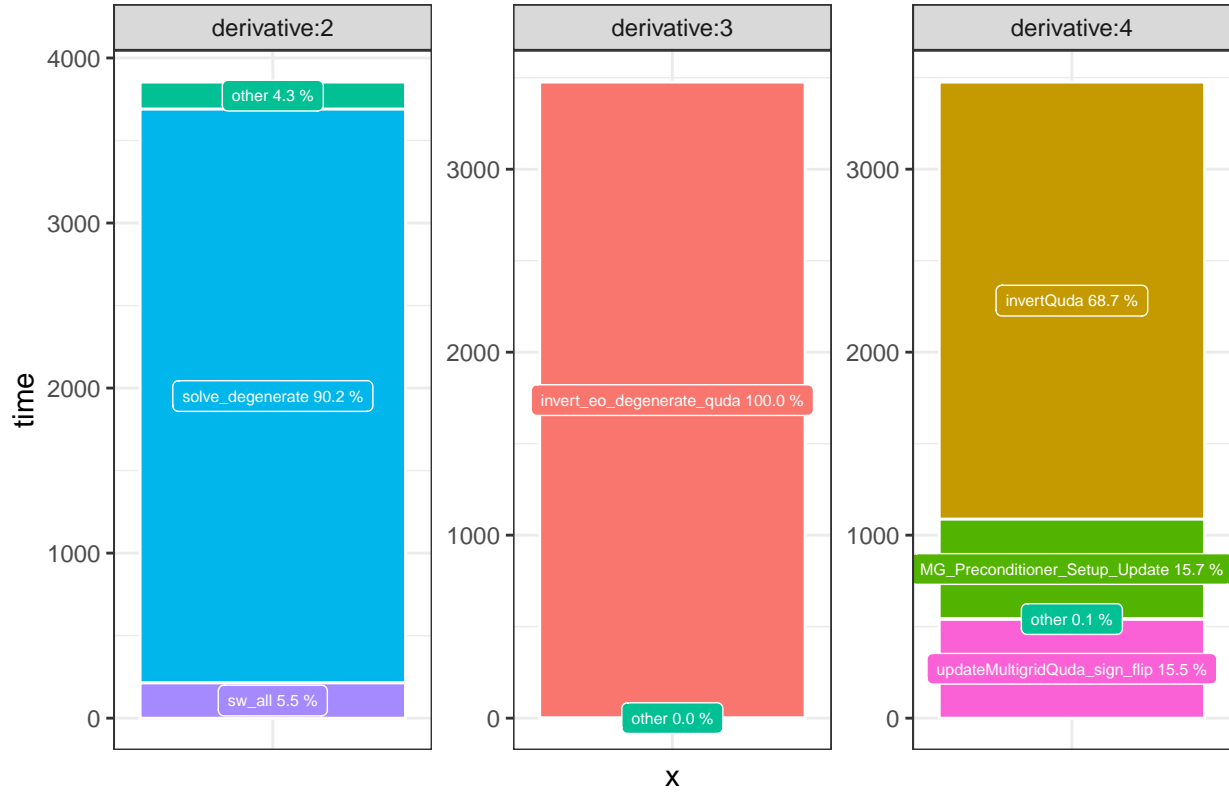
Table 10: cloverdetratio3light derivative

level	name	time	prop	invocations	unit_time
2	other	164.0	4.3	1210	0.1
2	solve_degenerate	3476.3	90.2	110	31.6
2	sw_all	213.5	5.5	110	1.9
3	invert_eo_degenerate_quda	3475.9	100.0	110	31.6
3	other	0.2	0.0	110	0.0
4	invertQuda	2388.7	68.7	220	10.9
4	MG_Preconditioner_Setup_Update	544.1	15.7	110	4.9
4	other	3.4	0.1	550	0.0
4	updateMultigridQuda_sign_flip	539.7	15.5	110	4.9

cloverdetratio3light heatbath
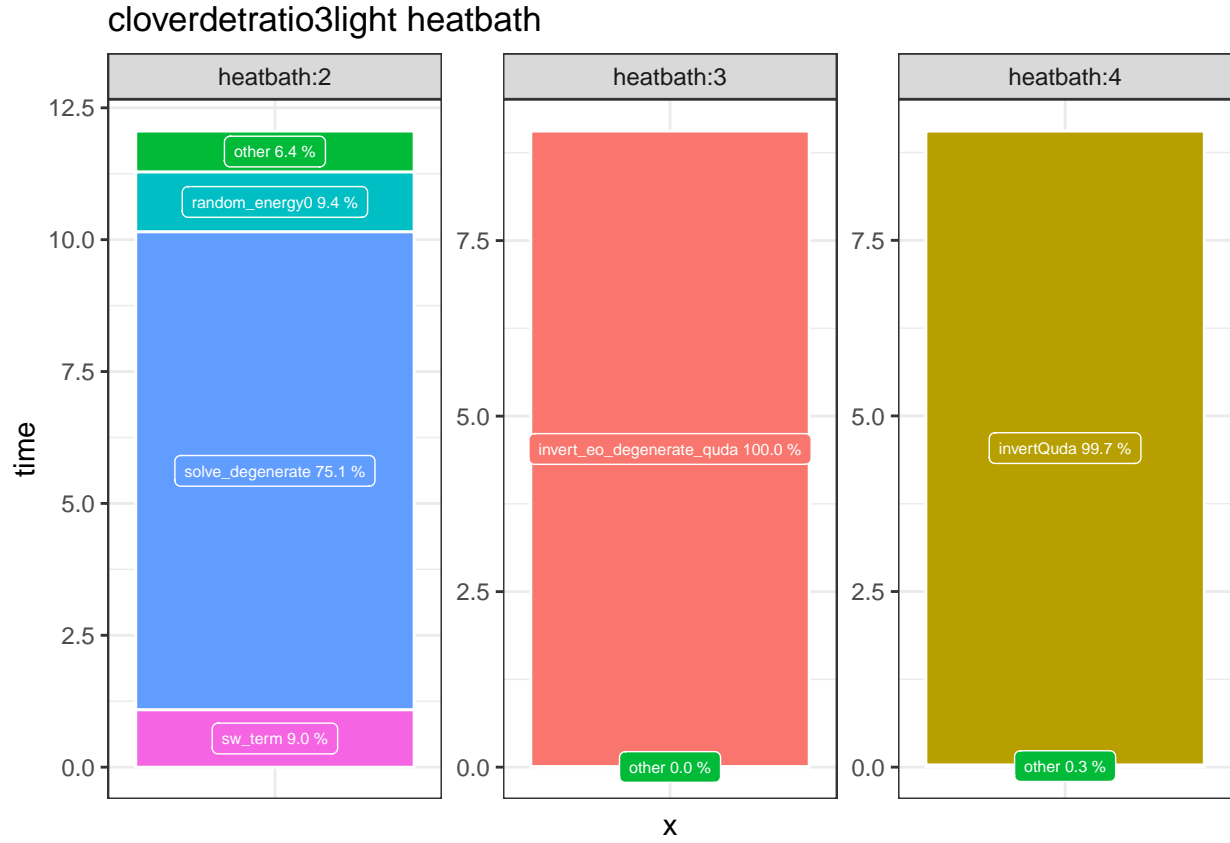
Table 11: cloverdetratio3light heatbath

level	name	time	prop	invocations	unit_time
2	other	0.8	6.4	4	0.2
2	random_energy0	1.1	9.4	2	0.6
2	solve_degenerate	9.1	75.1	2	4.5
2	sw_term	1.1	9.0	2	0.5
3	invert_eo_degenerate_quda	9.1	100.0	2	4.5
3	other	0.0	0.0	2	0.0
4	invertQuda	9.0	99.7	2	4.5
4	other	0.0	0.3	4	0.0

ndcloverrat3
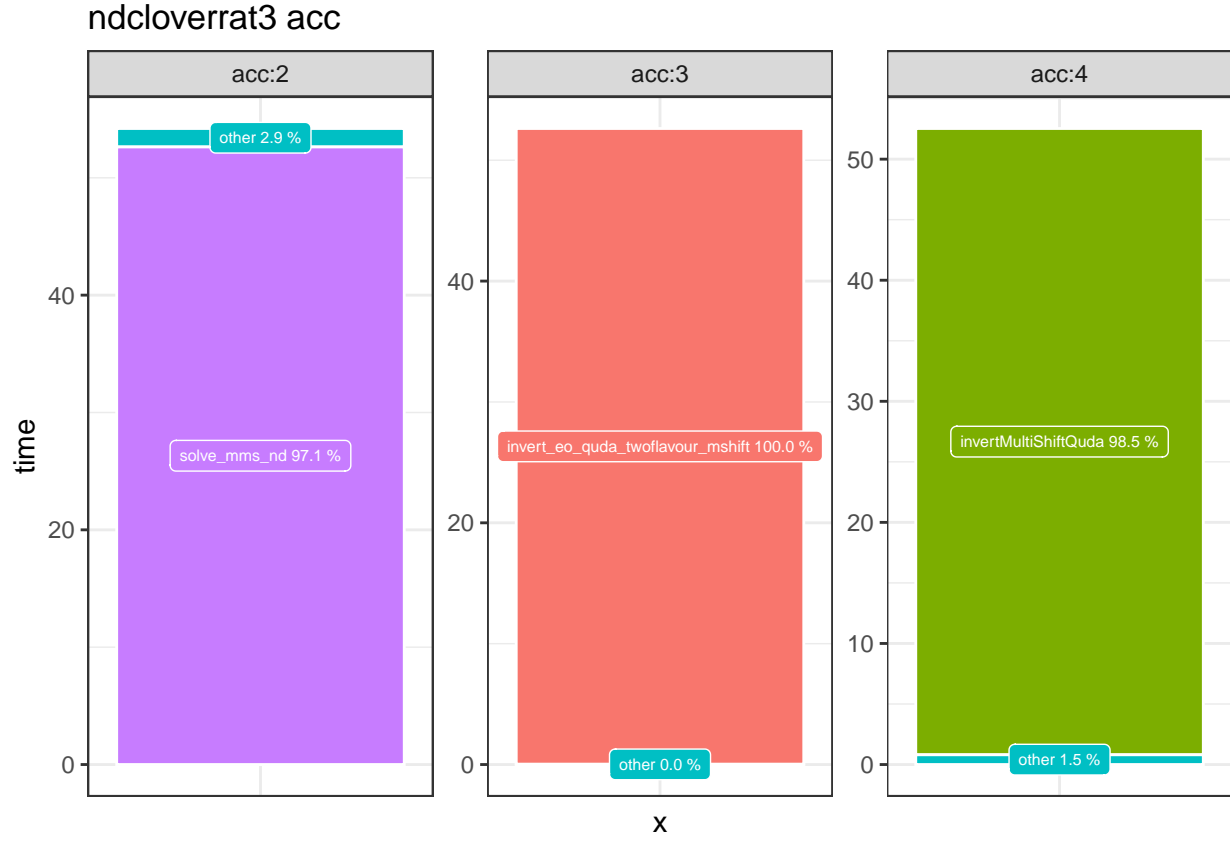
ndcloverrat3 acc

Table 12: ndcloverrat3 acc

level	name	time	prop	invocations	unit_time
2	other	1.6	2.9	6	0.3
2	solve_mms_nd	52.6	97.1	2	26.3
3	invert_eo_quda_twoflavour_mshift	52.6	100.0	2	26.3
3	other	0.0	0.0	4	0.0
4	invertMultiShiftQuda	51.7	98.5	2	25.9
4	other	0.8	1.5	22	0.0

ndcloverrat3 derivative
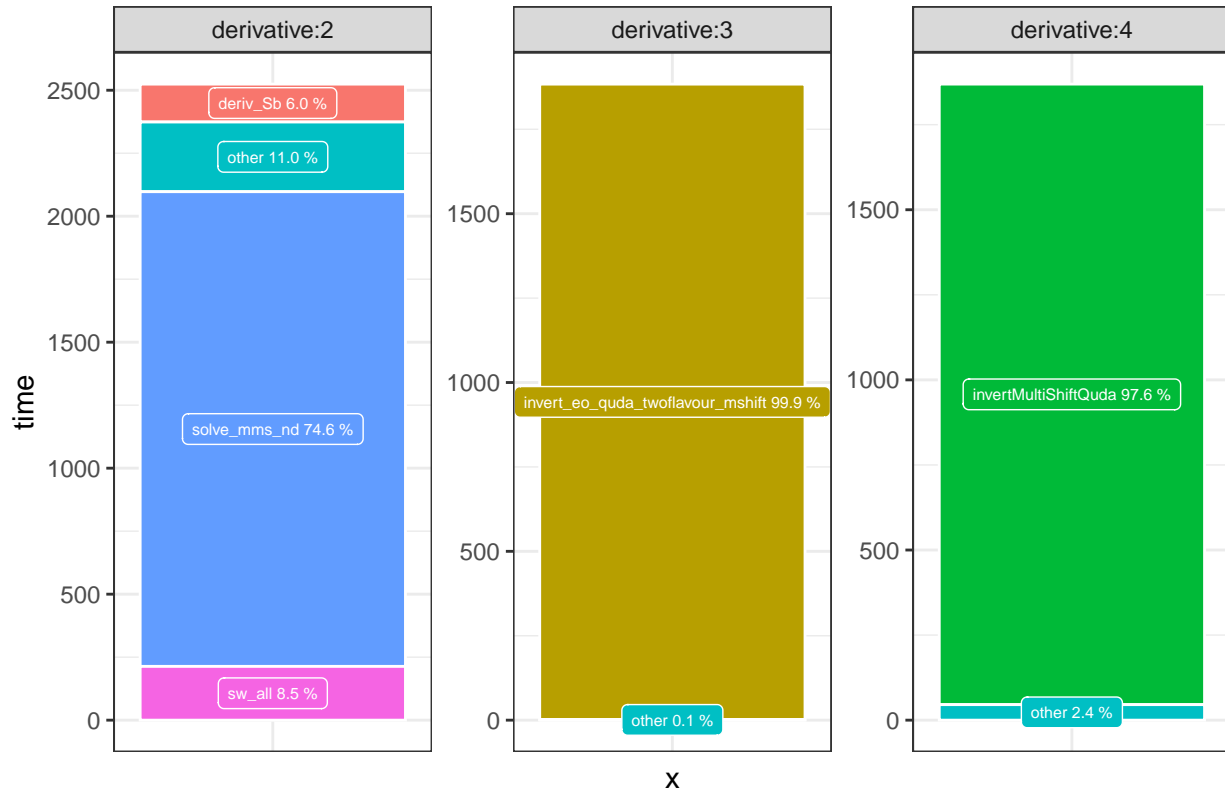
Table 13: ndcloverrat3 derivative

level	name	time	prop	invocations	unit_time
2	deriv_Sb	150.4	6.0	1320	0.1
2	other	276.6	11.0	2640	0.1
2	solve_mms_nd	1884.0	74.6	110	17.1
2	sw_all	213.4	8.5	110	1.9
3	invert_eo_quda_twoflavour_mshift	1882.5	99.9	110	17.1
3	other	1.4	0.1	220	0.0
4	invertMultiShiftQuda	1823.6	97.6	110	16.6
4	other	45.6	2.4	1210	0.0

ndcloverrat3 heatbath
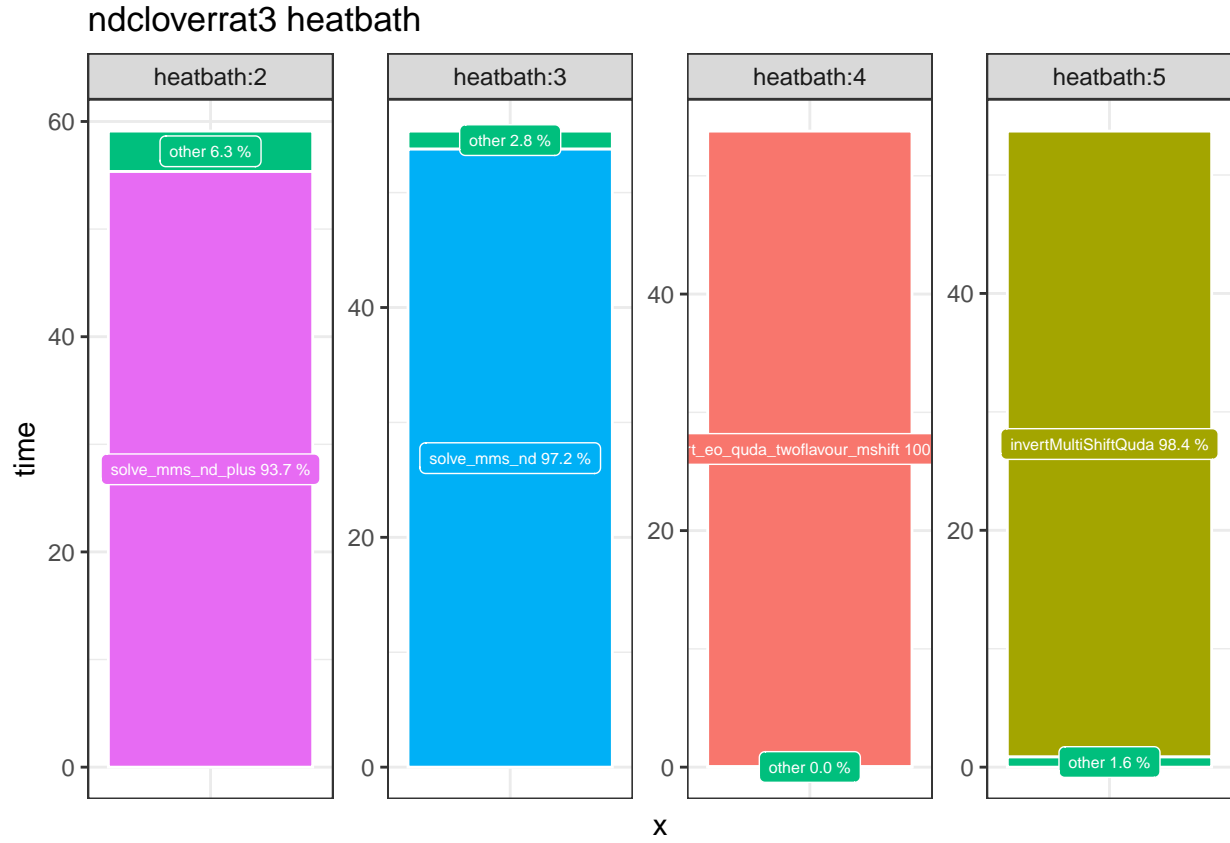
Table 14: ndcloverrat3 heatbath

level	name	time	prop	invocations	unit_time
2	other	3.8	6.3	6	0.6
2	solve_mms_nd_plus	55.4	93.7	2	27.7
3	other	1.6	2.8	2	0.8
3	solve_mms_nd	53.8	97.2	2	26.9
4	invert_eo_quda_twoflavour_mshift	53.8	100.0	2	26.9
4	other	0.0	0.0	4	0.0
5	invertMultiShiftQuda	52.8	98.4	2	26.4
5	other	0.9	1.6	22	0.0

ndcloverrat2
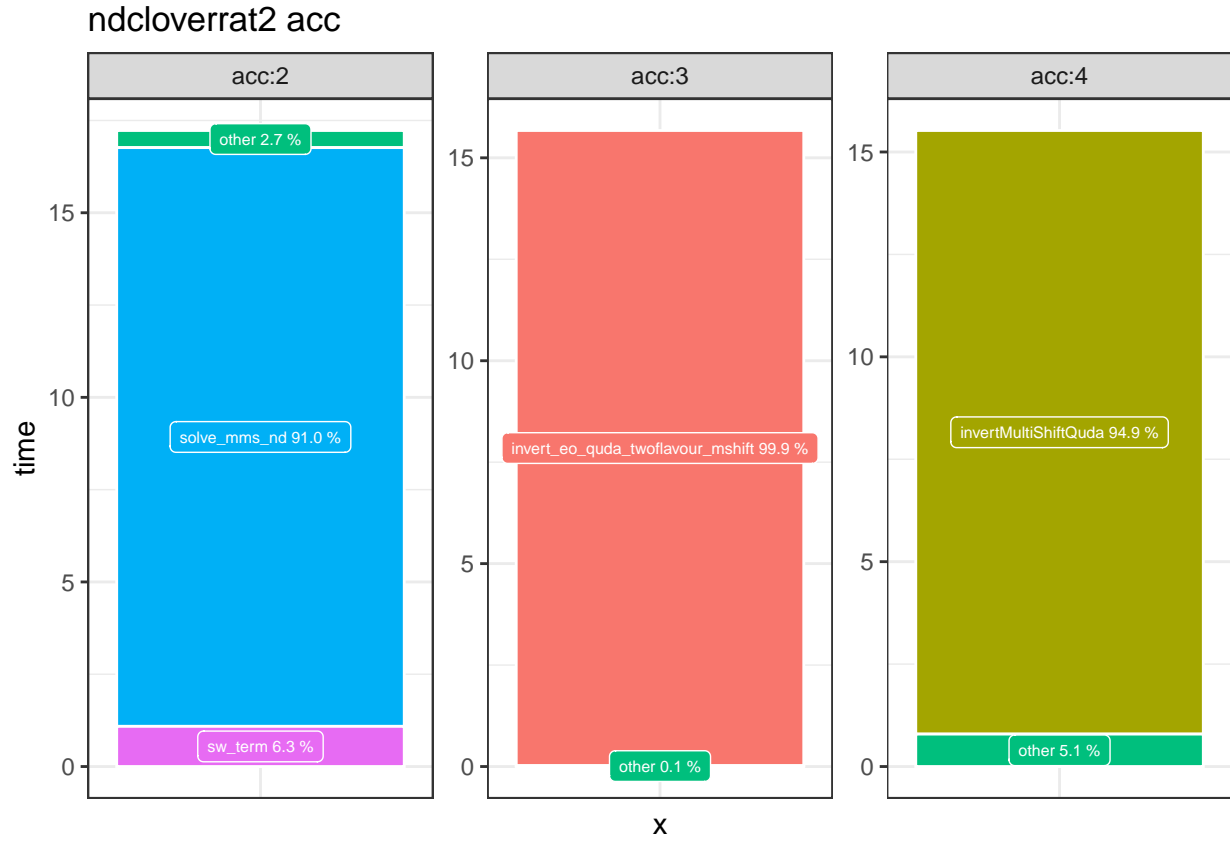
ndcloverrat2 acc

Table 15: ndcloverrat2 acc

level	name	time	prop	invocations	unit_time
2	other	0.5	2.7	4	0.1
2	solve_mms_nd	15.7	91.0	2	7.8
2	sw_term	1.1	6.3	2	0.5
3	invert_eo_quda_twoflavour_mshift	15.7	99.9	2	7.8
3	other	0.0	0.1	4	0.0
4	invertMultiShiftQuda	14.7	94.9	2	7.4
4	other	0.8	5.1	22	0.0

ndcloverrat2 derivative
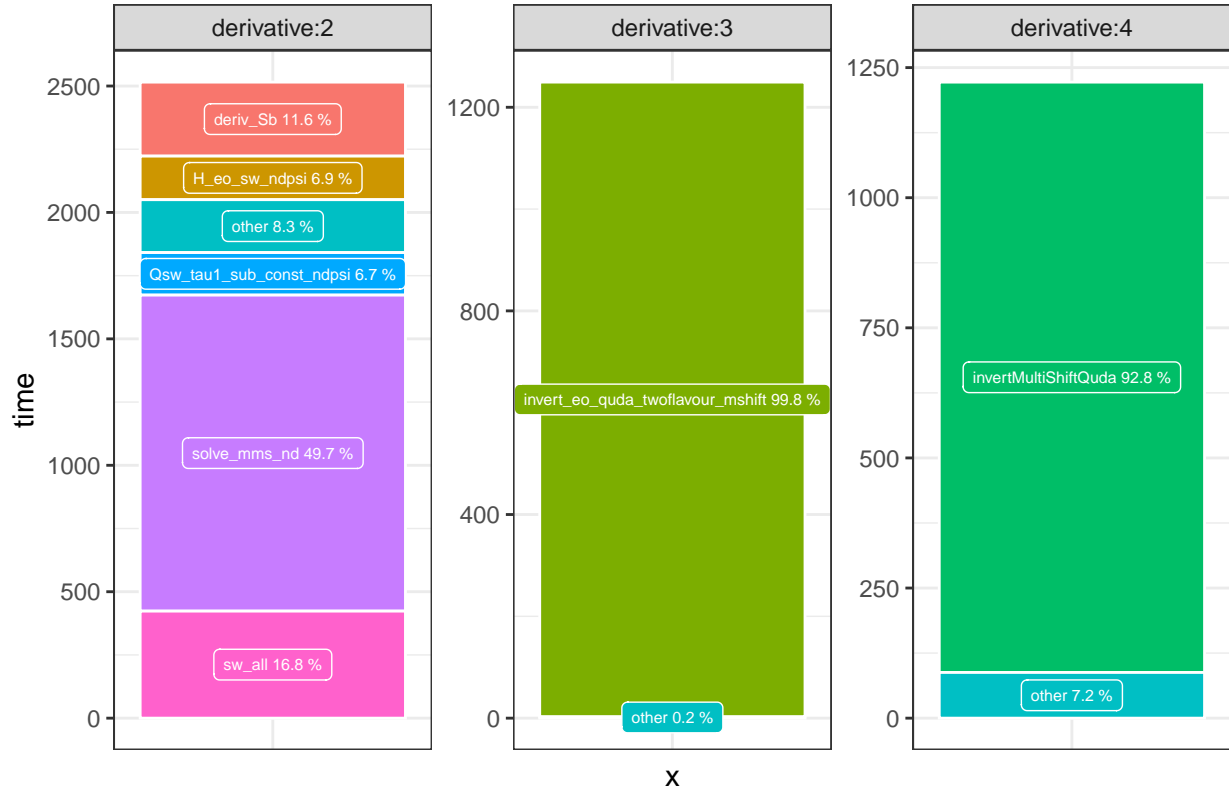
Table 16: ndcloverrat2 derivative

level	name	time	prop	invocations	unit_time
2	deriv_Sb	292.7	11.6	2616	0.1
2	H_eo_sw_ndpsi	172.4	6.9	1308	0.1
2	other	209.1	8.3	3270	0.1
2	Qsw_tau1_sub_const_ndpsi	168.2	6.7	654	0.3
2	solve_mms_nd	1249.7	49.7	218	5.7
2	sw_all	423.4	16.8	218	1.9
3	invert_eo_quda_twoflavour_mshift	1246.9	99.8	218	5.7
3	other	2.6	0.2	436	0.0
4	invertMultiShiftQuda	1134.3	92.8	218	5.2
4	other	87.8	7.2	2398	0.0

ndcloverrat2 heatbath
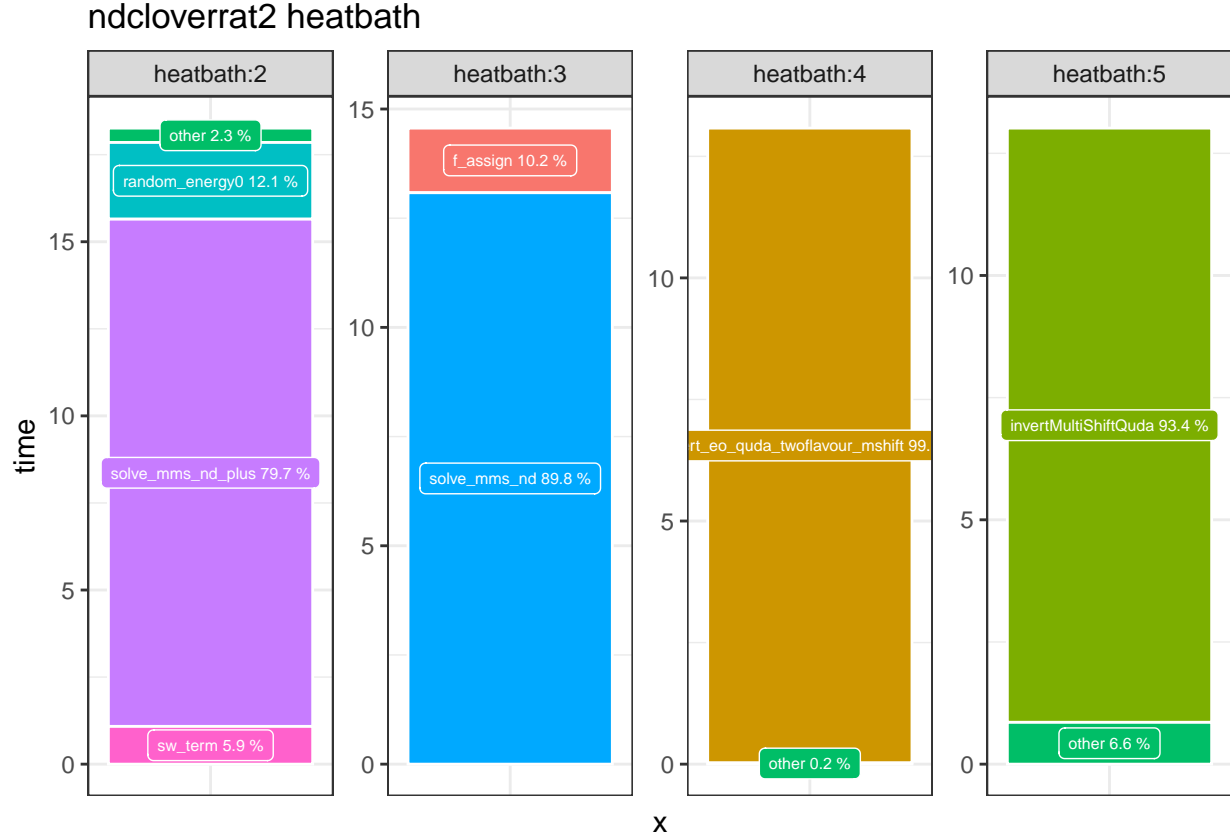
Table 17: ndcloverrat2 heatbath

level	name	time	prop	invocations	unit_time
2	other	0.4	2.3	2	0.2
2	random_energy0	2.2	12.1	2	1.1
2	solve_mms_nd_plus	14.6	79.7	2	7.3
2	sw_term	1.1	5.9	2	0.5
3	f_assign	1.5	10.2	2	0.7
3	solve_mms_nd	13.1	89.8	2	6.5
4	invert_eo_quda_twoflavour_mshift	13.1	99.8	2	6.5
4	other	0.0	0.2	4	0.0
5	invertMultiShiftQuda	12.2	93.4	2	6.1
5	other	0.9	6.6	22	0.0

cloverdetlight

cloverdetlight acc
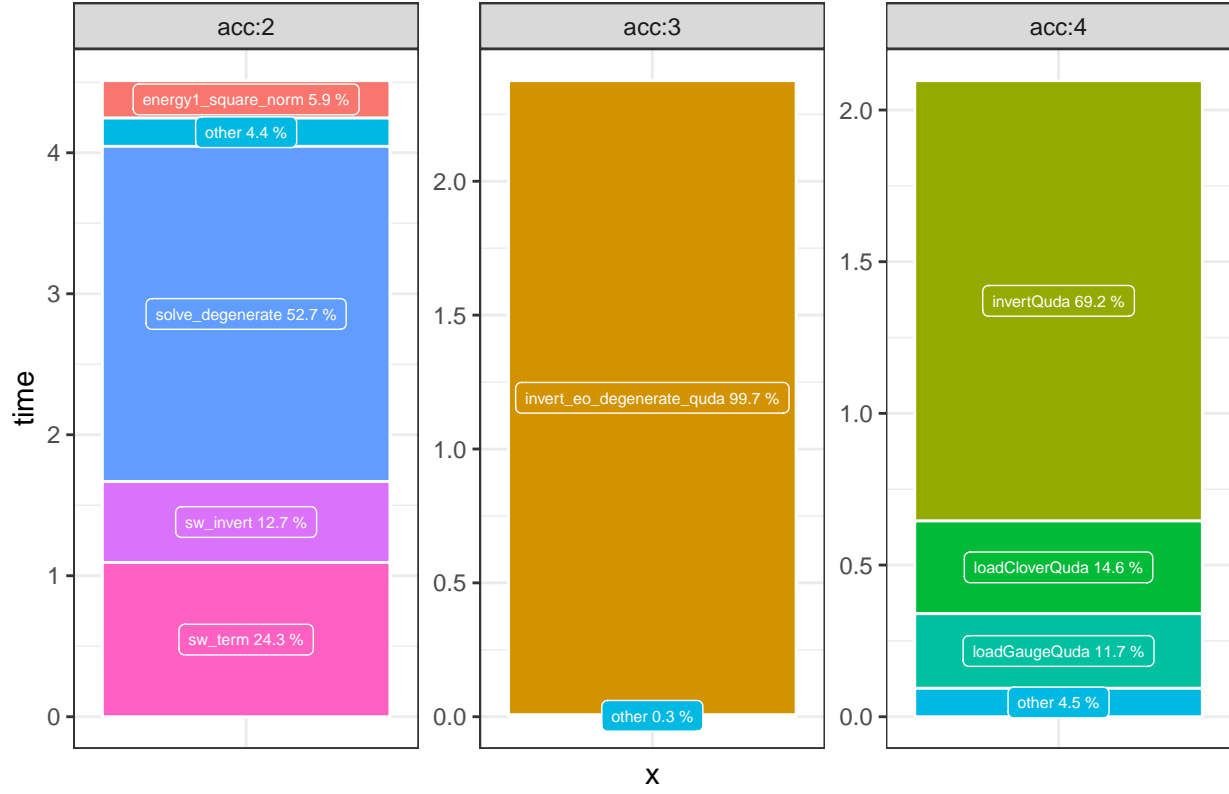
Table 18: cloverdetlight acc

level	name	time	prop	invocations	unit_time
2	energy1_square_norm	0.3	5.9	2	0.1
2	other	0.2	4.4	2	0.1
2	solve_degenerate	2.4	52.7	2	1.2
2	sw_invert	0.6	12.7	2	0.3
2	sw_term	1.1	24.3	2	0.5
3	invert_eo_degenerate_quda	2.4	99.7	2	1.2
3	other	0.0	0.3	4	0.0
4	invertQuda	1.5	69.2	2	0.7
4	loadCloverQuda	0.3	14.6	2	0.2
4	loadGaugeQuda	0.2	11.7	2	0.1
4	other	0.1	4.5	6	0.0

cloverdetlight derivative
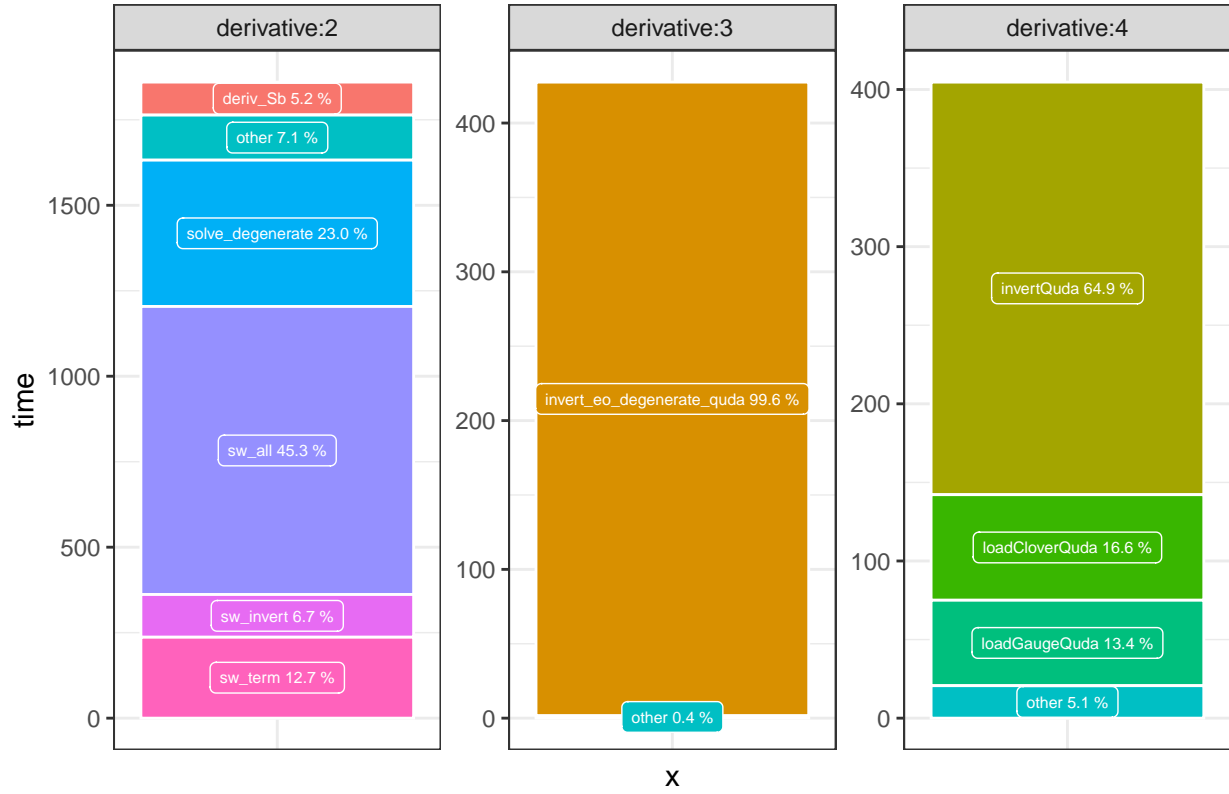
Table 19: cloverdetlight derivative

level	name	time	prop	invocations	unit_time
2	deriv_Sb	96.4	5.2	868	0.1
2	other	131.8	7.1	3038	0.0
2	solve_degenerate	427.9	23.0	434	1.0
2	sw_all	842.4	45.3	434	1.9
2	sw_invert	124.9	6.7	434	0.3
2	sw_term	236.7	12.7	434	0.5
3	invert_eo_degenerate_quda	425.9	99.6	434	1.0
3	other	1.6	0.4	868	0.0
4	invertQuda	262.5	64.9	434	0.6
4	loadCloverQuda	67.2	16.6	434	0.2
4	loadGaugeQuda	54.4	13.4	434	0.1
4	other	20.7	5.1	1302	0.0

cloverdetlight heatbath
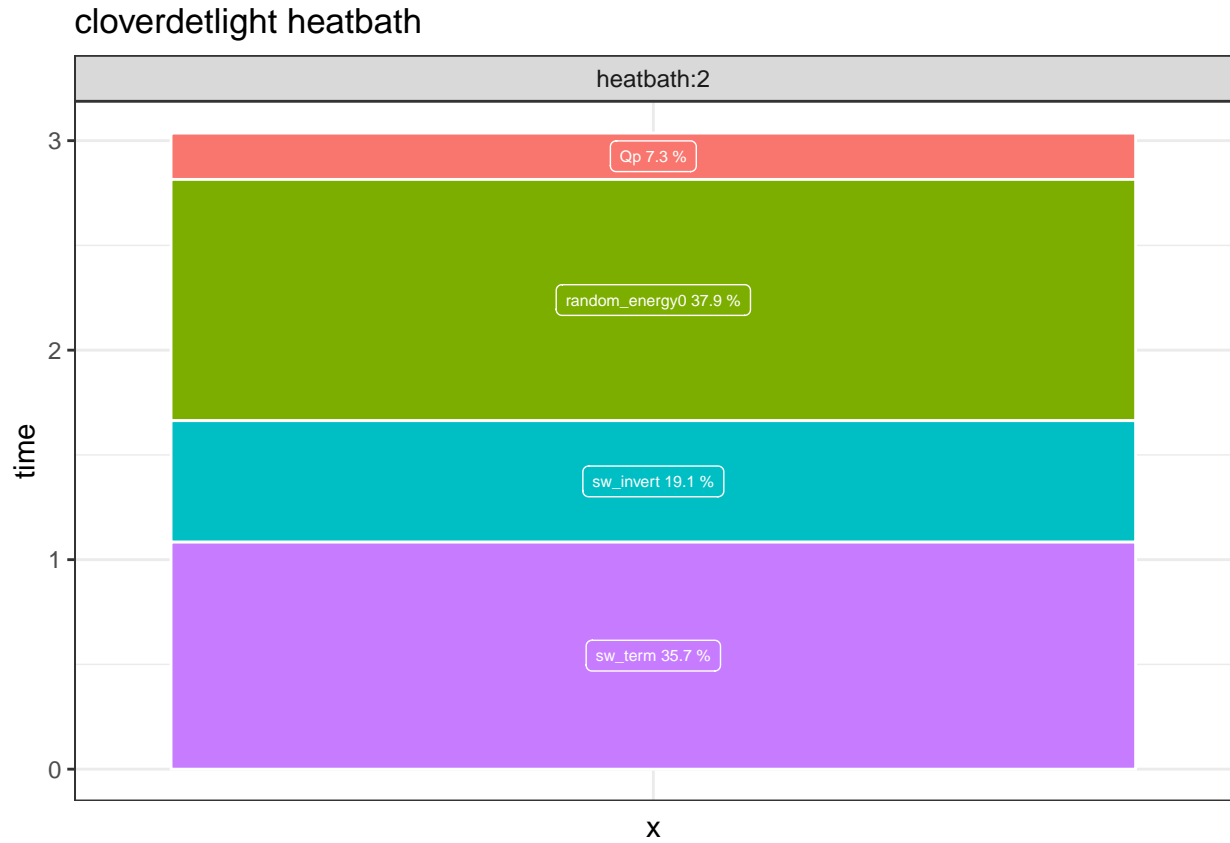
Table 20: cloverdetlight heatbath

level	name	time	prop	invocations	unit_time
2	Qp	0.2	7.3	2	0.1
2	random_energy0	1.2	37.9	2	0.6
2	sw_invert	0.6	19.1	2	0.3
2	sw_term	1.1	35.7	2	0.5

cloverdetratio1light

cloverdetratio1light acc
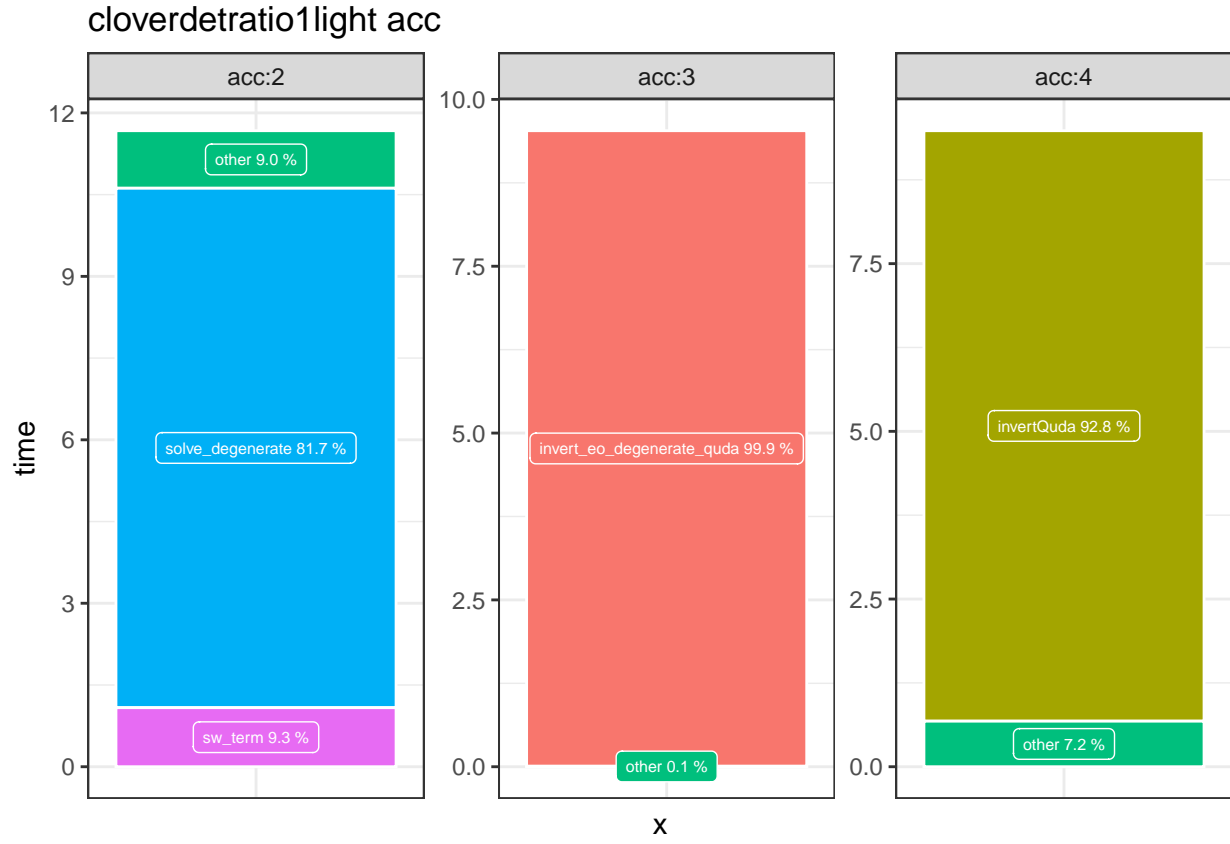
Table 21: cloverdetratio1light acc

level	name	time	prop	invocations	unit_time
2	other	1.1	9.0	8	0.1
2	solve_degenerate	9.5	81.7	2	4.8
2	sw_term	1.1	9.3	2	0.5
3	invert_eo_degenerate_quda	9.5	99.9	2	4.8
3	other	0.0	0.1	4	0.0
4	invertQuda	8.8	92.8	2	4.4
4	other	0.7	7.2	10	0.1

cloverdetratio1light derivative
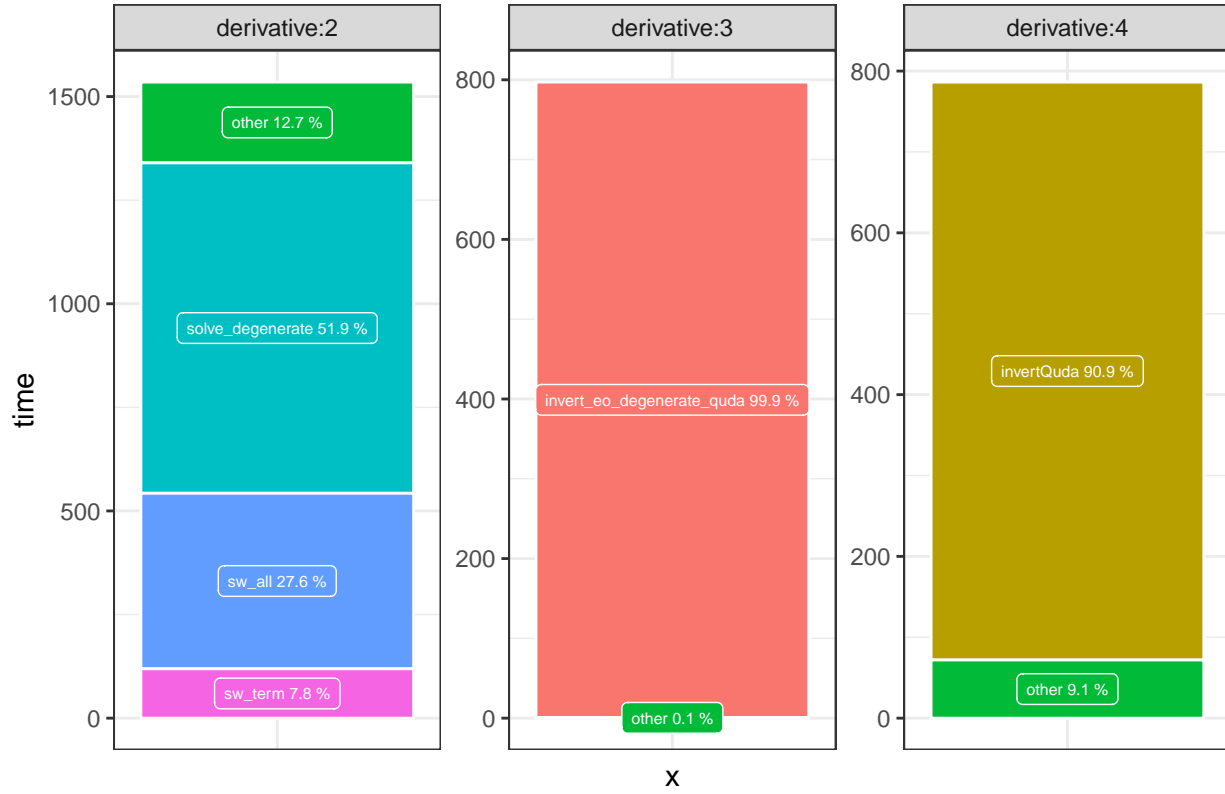
Table 22: cloverdetratio1light derivative

level	name	time	prop	invocations	unit_time
2	other	194.9	12.7	2180	0.1
2	solve_degenerate	797.3	51.9	218	3.7
2	sw_all	423.6	27.6	218	1.9
2	sw_term	119.1	7.8	218	0.5
3	invert_eo_degenerate_quda	796.4	99.9	218	3.7
3	other	0.7	0.1	436	0.0
4	invertQuda	714.5	90.9	218	3.3
4	other	71.9	9.1	1090	0.1

cloverdetratio1light heatbath
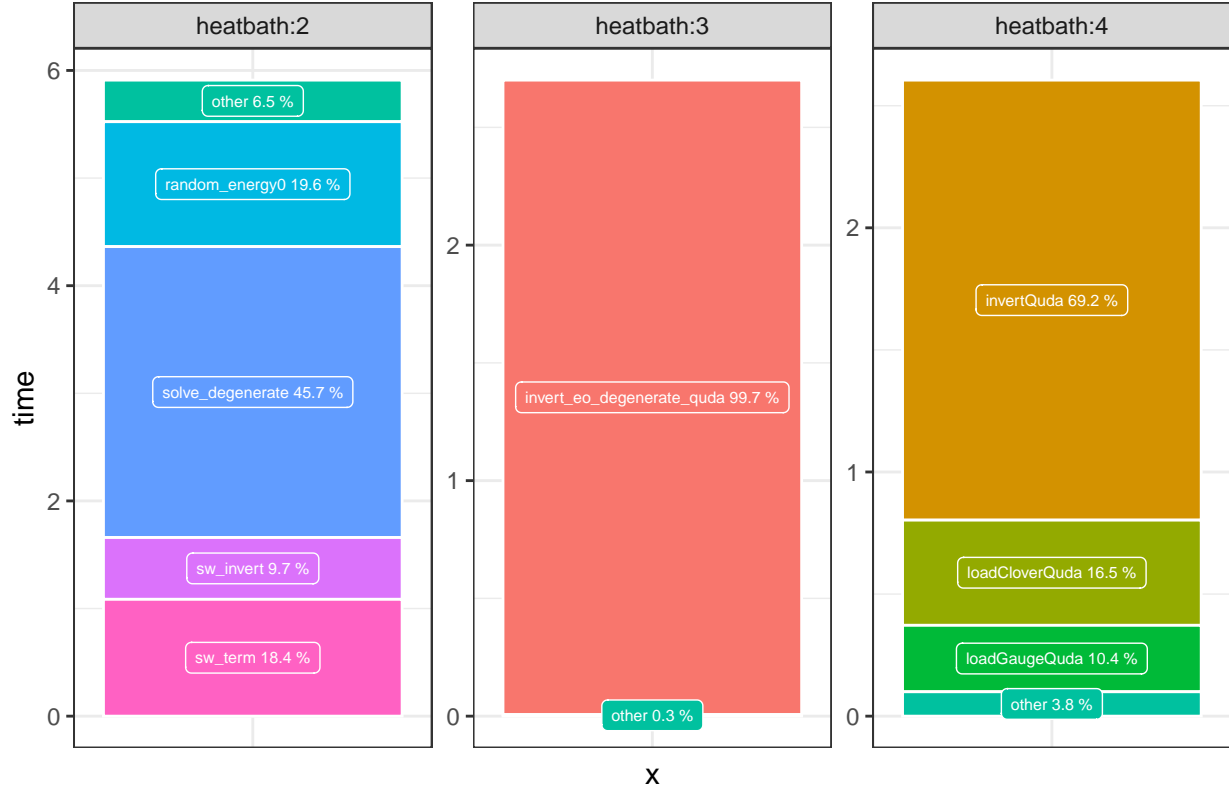
Table 23: cloverdetratio1light heatbath

level	name	time	prop	invocations	unit_time
2	other	0.4	6.5	4	0.1
2	random_energy0	1.2	19.6	2	0.6
2	solve_degenerate	2.7	45.7	2	1.4
2	sw_invert	0.6	9.7	2	0.3
2	sw_term	1.1	18.4	2	0.5
3	invert_eo_degenerate_quda	2.7	99.7	2	1.3
3	other	0.0	0.3	4	0.0
4	invertQuda	1.8	69.2	2	0.9
4	loadCloverQuda	0.4	16.5	2	0.2
4	loadGaugeQuda	0.3	10.4	2	0.1
4	other	0.1	3.8	6	0.0

ndcloverratcor

ndcloverratcor acc
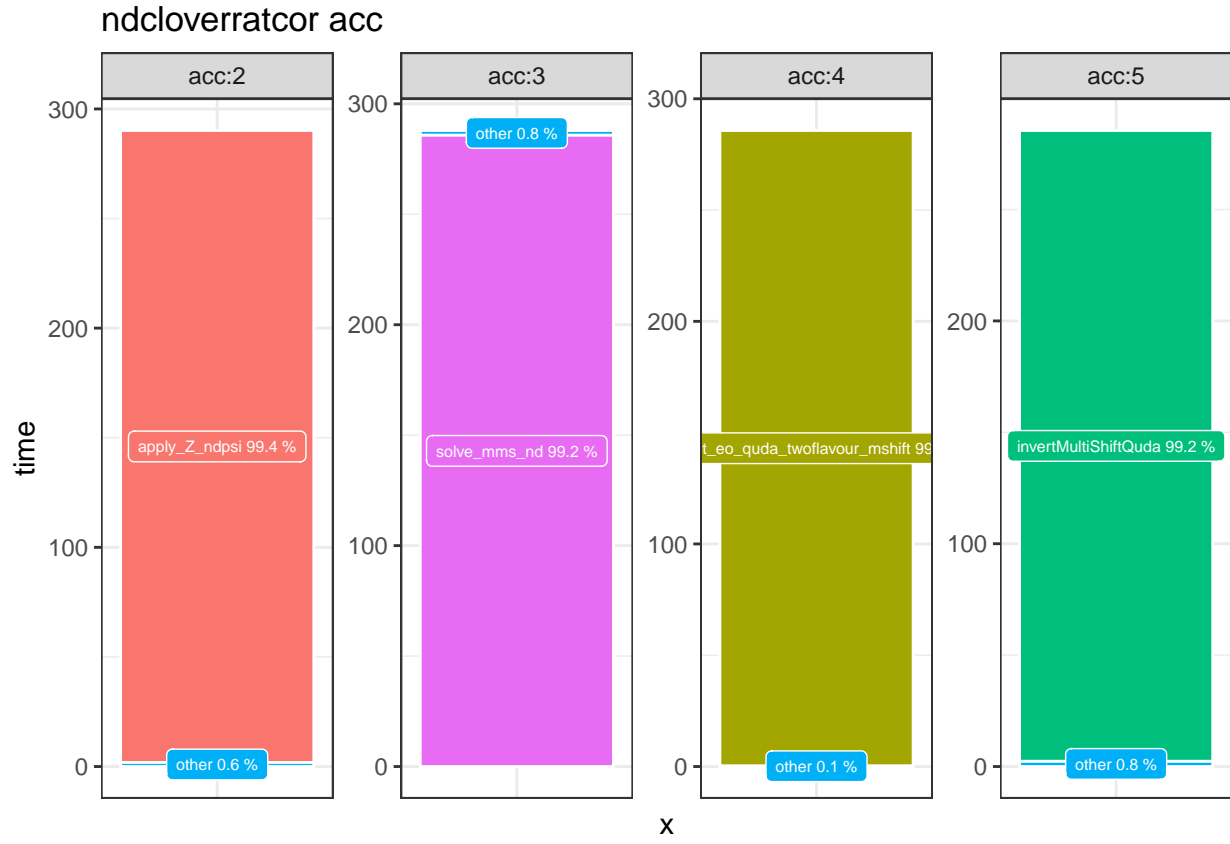
Table 24: ndcloverratcor acc

level	name	time	prop	invocations	unit_time
2	apply__Z__ndpsi	288.3	99.4	4	72.1
2	other	1.8	0.6	14	0.1
3	other	2.2	0.8	4	0.5
3	solve__mms__nd	285.8	99.2	8	35.7
4	invert__eo__quda__twoflavour__mshift	285.5	99.9	8	35.7
4	other	0.2	0.1	16	0.0
5	invertMultiShiftQuda	283.1	99.2	8	35.4
5	other	2.3	0.8	176	0.0

ndcloverratcor heatbath
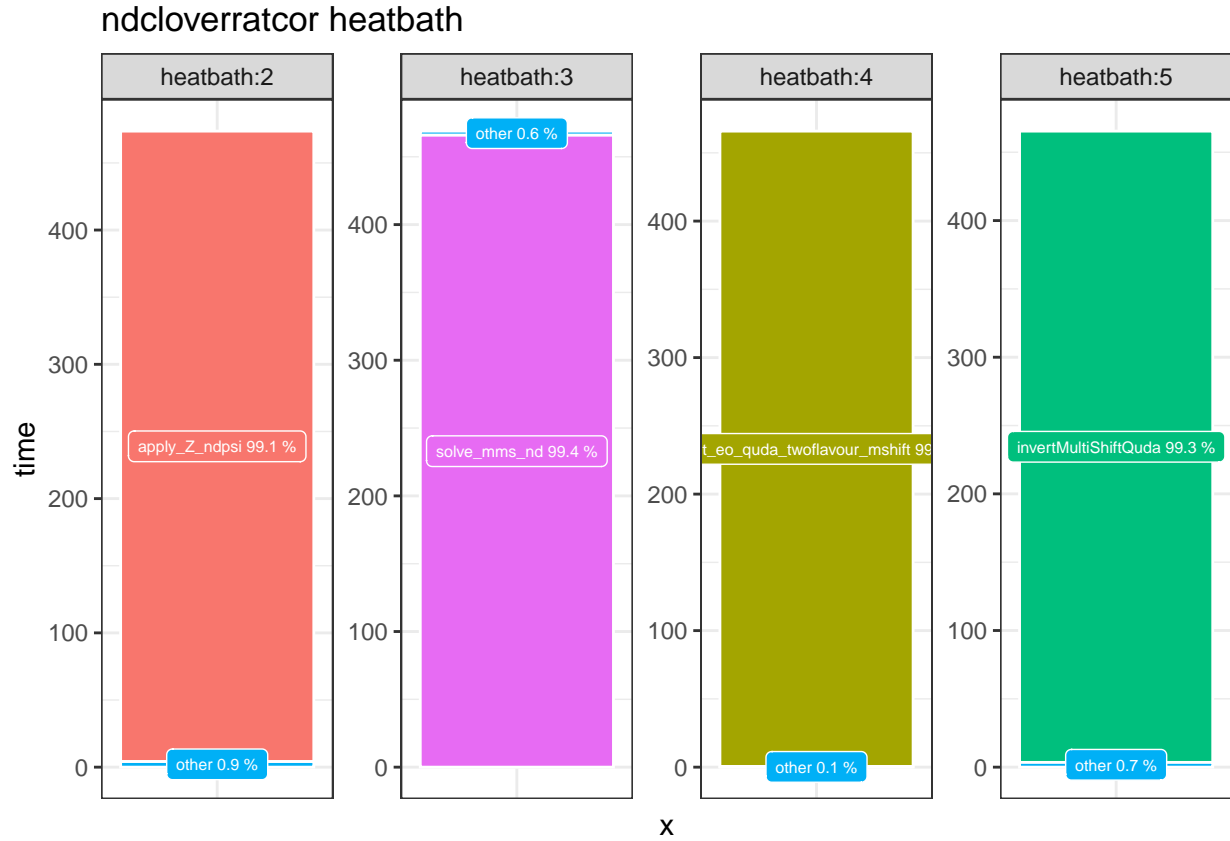
Table 25: ndcloverratcor heatbath

level	name	time	prop	invocations	unit_time
2	apply__Z_ndpsi	469.5	99.1	6	78.3
2	other	4.2	0.9	14	0.3
3	other	3.0	0.6	6	0.5
3	solve_mms_nd	465.9	99.4	12	38.8
4	invert__eo__quda__twoflavour__mshift	465.6	99.9	12	38.8
4	other	0.4	0.1	24	0.0
5	invertMultiShiftQuda	462.0	99.3	12	38.5
5	other	3.5	0.7	264	0.0

GAUGE

GAUGE derivative
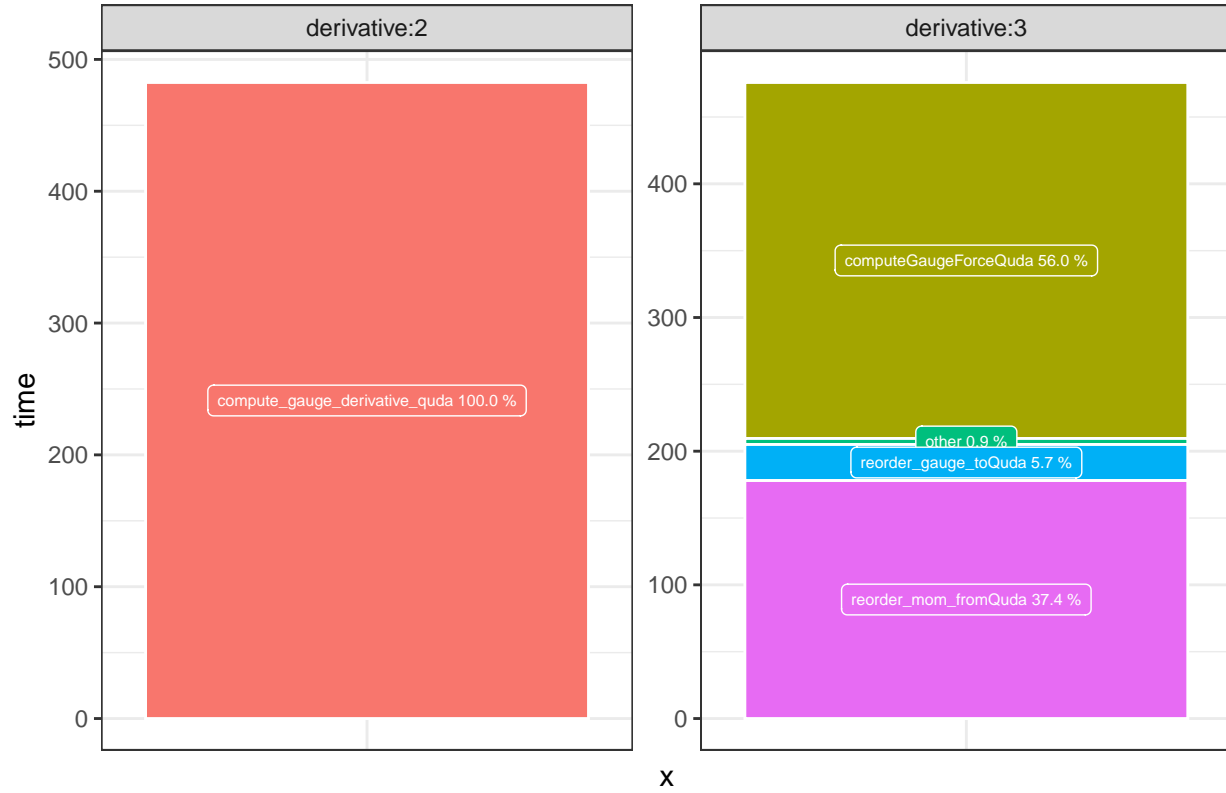
Table 26: GAUGE derivative

level	name	time	prop	invocations	unit_time
2	compute__gauge__derivative__quda	482.5	100.0	866	0.6
3	computeGaugeForceQuda	266.3	56.0	866	0.3
3	other	4.5	0.9	866	0.0
3	reorder__gauge__toQuda	27.0	5.7	866	0.0
3	reorder__mom__fromQuda	178.0	37.4	866	0.2