Libpll sequential benchmarks

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1 Benchmark description

The following benchmarks compare several libpll implementations with different modes. They measure the execution time of a full likelihood computation on a fixed tree. To avoid measuring the initialization part, we repeat several times `pll_update_partials` and `pll_compute_edge_likelihood` on the same partitions and tree.

- xflouris means that the implentation used is this one: https://github.com/xflouris/libpll.
- bmorel means that the implementation used is this one: https://github.com/BenoitMorel/libpll. It supports sites repeats, and the data structure used is a bit different from xflouris (even without sites repeats): CLVs are not supposed to be sorted by sites, and an additional lookup table is used to access them in most of the core functions.
- bmorel2 is a (temporary) hacked version of bmorel where I do not use the new lookup structure for the scalers, because it slows down the execution.
- default mode means that the option `PLL_ATTRIB_PATTERN_TIP` and `PLL_ATTRIB_SITES_REPEATS` are unset.
- tip pattern means that the option `PLL_ATTRIB_PATTERN_TIP` is set.
- sites repeats means that the option `PLL_ATTRIB_SITES_REPEATS` is set.
- M is the size of the buffer allocated to compute the sites repeats class identifiers. When it increases, more nodes can benefit from sites repeats.

2 Benchmark

CPU architecture, 50 iterations

	seq59	seq128	seq404
xflouris default mode	914.174 ms	13117.2 ms	16046 ms
bmorel default mode	1042.58 ms	13661.6 ms	16382.4 ms
bmorel2 default mode	992.292 ms	12873.5 ms	16868 ms
xflouris tip pattern	622.147 ms	8201.95 ms	10547.2 ms
bmorel tip pattern	651.691 ms	8318.99 ms	10520.1 ms
bmorel2 tip pattern	640.471 ms	8172.06 ms	10692.9 ms
bmorel sites repeats M=1000	451.117 ms	5090.6 ms	7050.93 ms
bmorel sites repeats M=10000	398.956 ms	4153.21 ms	5067.71 ms
bmorel sites repeats M=100000	293.024 ms	3423.4 ms	3573.44 ms
bmorel sites repeats M=1000000	280.143 ms	2949.29 ms	2534.16 ms

SSE architecture, 50 iterations

	seq59	seq128	seq404
xflouris default mode	413.094 ms	6072.96 ms	7049.57 ms
bmorel default mode	461.801 ms	6398.17 ms	7681.47 ms
bmorel2 default mode	468.726 ms	6228.97 ms	7565.03 ms
xflouris tip pattern	319.607 ms	4776.39 ms	5040.66 ms
bmorel tip pattern	309.635 ms	4339.21 ms	5157.63 ms
bmorel2 tip pattern	298.748 ms	4590 ms	5279.53 ms
bmorel sites repeats M=1000	217.187 ms	2742.01 ms	3558.85 ms
bmorel sites repeats M=10000	209.901 ms	2354.21 ms	2927.92 ms
bmorel sites repeats M=100000	175.419 ms	2071.44 ms	2153.63 ms
bmorel sites repeats M=1000000	192.582 ms	2058.54 ms	1872.86 ms

AVX architecture, 50 iterations

	seq59	seq128	seq404
xflouris default mode	415.107 ms	5826.5 ms	6296.53 ms
bmorel default mode	426.792 ms	5873.65 ms	6779.5 ms
bmorel2 default mode	406.775 ms	5886.97 ms	6833.39 ms
xflouris tip pattern	269.162 ms	3946.43 ms	4229.77 ms
bmorel tip pattern	324.054 ms	4157.28 ms	4914.1 ms
bmorel2 tip pattern	303.718 ms	4242.79 ms	4672.12 ms
bmorel sites repeats M=1000	199.408 ms	2577.97 ms	3193.56 ms
bmorel sites repeats M=10000	178.793 ms	2227.78 ms	3092.88 ms
bmorel sites repeats M=100000	192.671 ms	2119.69 ms	2126.33 ms
bmorel sites repeats M=1000000	193.113 ms	2053.05 ms	1722.82 ms

CPU architecture, 500 iterations

plop	seq59
xflouris default mode	10348.6 ms
xflouris tip pattern	6380.97 ms
bmorel default mode	10602.9 ms
bmorel tip pattern	7325.77 ms
bmorel2 default mode	10261.6 ms
bmorel2 tip pattern	6411.07 ms
bmorel sites repeats M=1000	4460.38 ms
bmorel sites repeats M=10000	4523.62 ms
bmorel sites repeats M=100000	3014.89 ms
bmorel sites repeats M=1000000	2815.2 ms

SSE architecture, 500 iterations

	seq59
xflouris default mode	4040.03 ms
xflouris tip pattern	2771.82 ms
bmorel default mode	4320.65 ms
bmorel tip pattern	3145.92 ms
bmorel2 default mode	3992.32 ms
bmorel2 tip pattern	2818.21 ms
bmorel sites repeats M=1000	2068.11 ms
bmorel sites repeats M=10000	1765.29 ms
bmorel sites repeats M=100000	1823.84 ms
bmorel sites repeats M=1000000	1901.32 ms

AVX architecture, 500 iterations

	seq59
xflouris default mode	3748.08 ms
xflouris tip pattern	2606.39 ms
bmorel default mode	4016.64 ms
bmorel tip pattern	2640.11 ms
bmorel2 default mode	3847.33 ms
bmorel2 tip pattern	2597.35 ms
bmorel sites repeats M=1000	1836.71 ms
bmorel sites repeats M=10000	1645.21 ms
bmorel sites repeats M=100000	1441.79 ms
bmorel sites repeats M=1000000	1447.22 ms