

Fys4150

Project 4 Figures and stuff

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<https://github.com/kaaja/fys4150>

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4b

mcs	Eavg	absMavg	Cv	chi
100	-2.000000	1.000000	0.000000	0.000000
1000	-1.994000	0.998000	0.047856	0.005984
10000	-1.993800	0.997900	0.049446	0.006382
100000	-1.995360	0.998450	0.037034	0.004650
1000000	-1.995910	0.998620	0.032653	0.004182
10000000	-1.995949	0.998646	0.032349	0.004064
100000000	-1.995968	0.998656	0.032195	0.004024
1000000000	-1.995976	0.998659	0.032133	0.004016
1410065408	-1.995978	0.998660	0.032114	0.004011

Table 1: Estimated quantities

mcs	Eavg	absMavg	Cv	chi
100	0.201300	0.134106	-100.000000	-100.000000
1000	-0.099304	-0.066162	49.166215	49.199418
10000	-0.109324	-0.076175	54.122962	59.131750
100000	-0.031167	-0.021102	15.433885	15.948442
1000000	-0.003612	-0.004079	1.779036	4.279582
10000000	-0.001658	-0.001435	0.830445	1.319746
100000000	-0.000696	-0.000456	0.350614	0.335773
1000000000	-0.000320	-0.000187	0.156479	0.120349
1410065408	-0.000200	-0.000077	0.097802	0.016475

Table 2: Percentage deviations from analytical results

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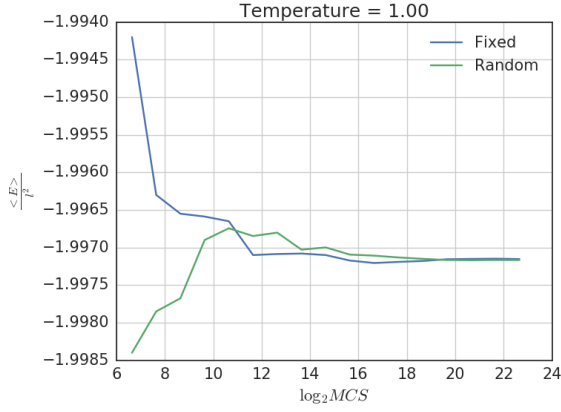


Figure 1: Expected Energy divided by L^2 . $T = 1.0$.
Equilibrium reached after 2^{20} Monte Carlo cycles.

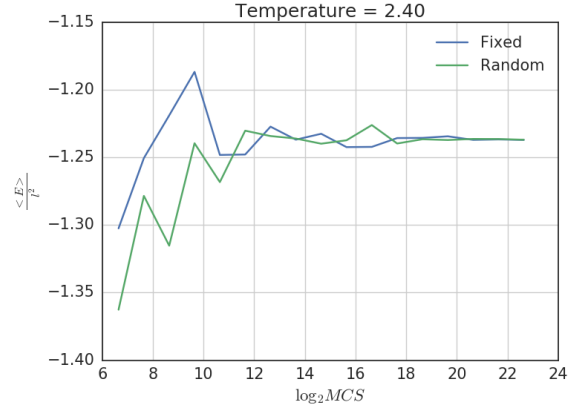


Figure 2: Expected Energy divided by L^2 . $T = 2.4$.
Equilibrium reached at same point as for $T = 1$.

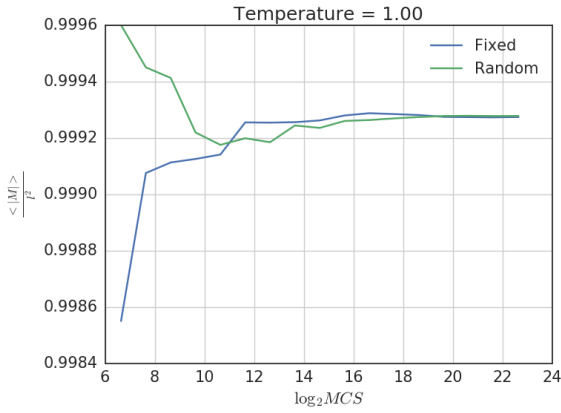


Figure 3: Expected absolute magnetic momentum divided by L^2 . $T = 1.0$.
Equilibrium reached at same point as for the energy.

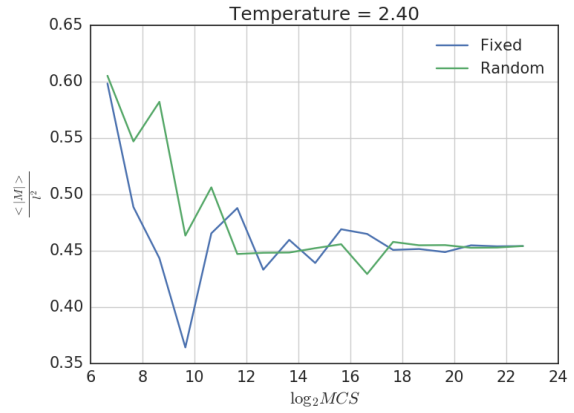


Figure 4: Expected absolute magnetic momentum divided by L^2 . $T = 2.4$.
Equilibrium reached at same point as for the others.

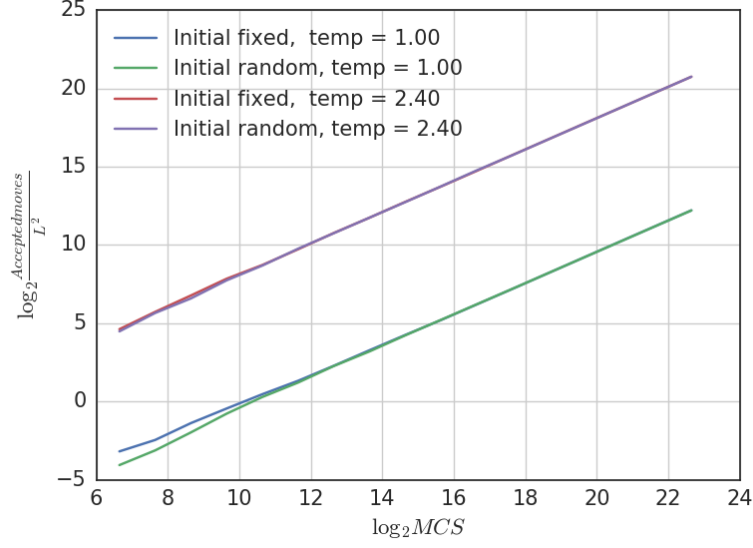


Figure 5: Accepted moved divided by L^2 .

2 4d

T	μ_E/L^2	$\langle E \rangle / L^2$	$(\frac{\mu_E/L^2}{\langle E \rangle / L^2} - 1) \cdot 100$	σ_E^2/L^2	$\frac{\langle E^2 \rangle - \langle E \rangle^2}{L^2}$	$(\frac{\sigma_E/L^2}{1/L^2(\langle E^2 \rangle - \langle E \rangle^2)} - 1) \cdot 100$	$\langle M \rangle$	$\frac{\langle M ^2 \rangle - \langle M \rangle^2}{L^2}$	Cv	chi
1.0	-1.997147	-1.997147	-2.262825e-06	0.023502	0.023502	1.631935e-08	0.999272	0.001581	0.023502	0.001581
2.4	-1.237184	-1.237184	-4.280954e-07	8.115934	8.115934	-3.473641e-07	0.455388	21.071678	1.409016	8.779866

Table 3: Statistics. Fixed initial config.

T	μ_E/L^2	$\langle E \rangle / L^2$	$(\frac{\mu_E/L^2}{\langle E \rangle / L^2} - 1) \cdot 100$	σ_E^2/L^2	$\frac{\langle E^2 \rangle - \langle E \rangle^2}{L^2}$	$(\frac{\sigma_E/L^2}{1/L^2(\langle E^2 \rangle - \langle E \rangle^2)} - 1) \cdot 100$	$\langle M \rangle$	$\frac{\langle M ^2 \rangle - \langle M \rangle^2}{L^2}$	Cv	chi
1.0	-1.997167	-1.997167	0.000002	0.023282	0.023282	4.737823e-07	0.999278	0.001560	0.023282	0.001560
2.4	-1.237434	-1.237434	0.000002	8.120920	8.120920	-3.309991e-08	0.454392	21.240055	1.409882	8.850023

Table 4: Statistics. Random initial config.

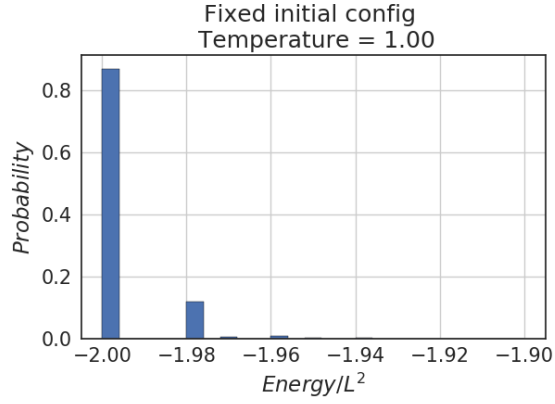


Figure 6: Probability distribution. Fixed initial $T = 1$.

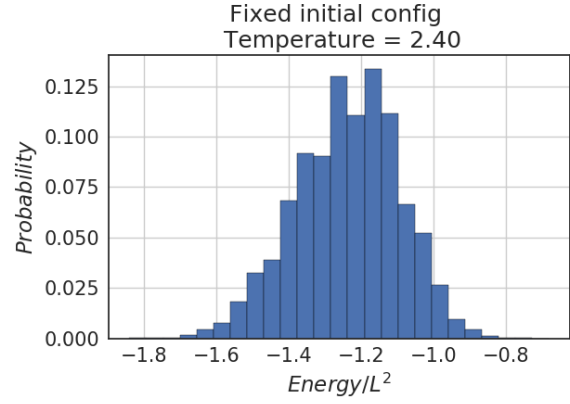


Figure 7: Probability distribution. Fixed initial $T = 2.4$.

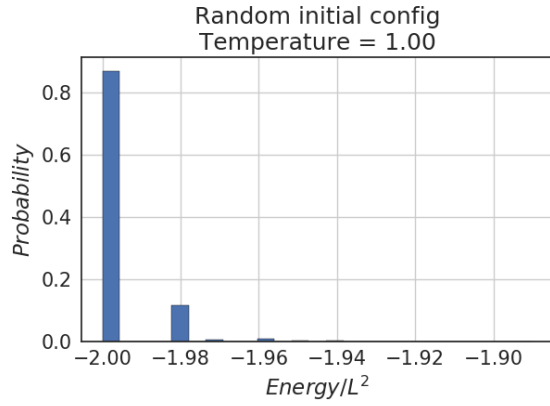


Figure 8: Probability distribution. Random initial $T = 1$.

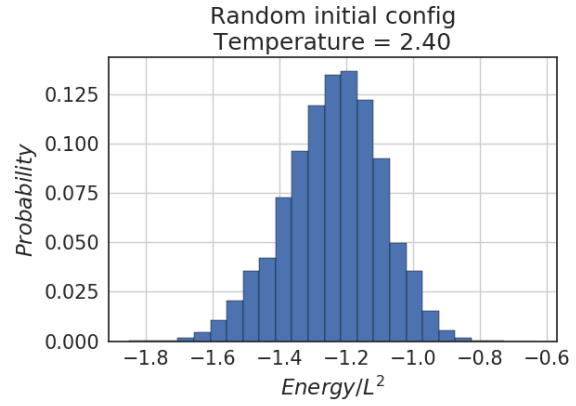


Figure 9: Probability distribution. Random initial $T = 2.4$.

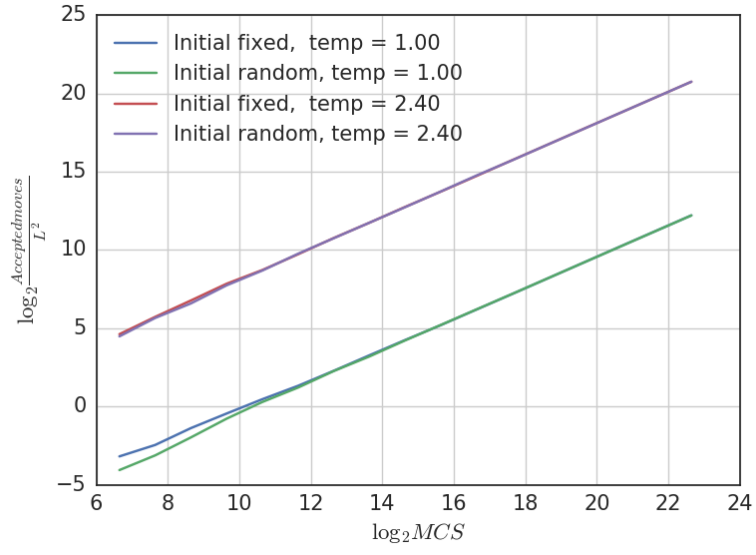


Figure 10: Accepted moved divided by L^2 .