Chiral condensate as a function of the time extension

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In previous weeks we found out that there is a symmetry of the chiral condensate obtained trough simulations on $N_s \times N_t$ lattices with Wilson fermions if one interchanges N_s with N_t, that is, the chiral condensate is the same for the lattice sizes $N_s \times N_t$ and $N_t \times N_s$. Figure 1 is an example of this.

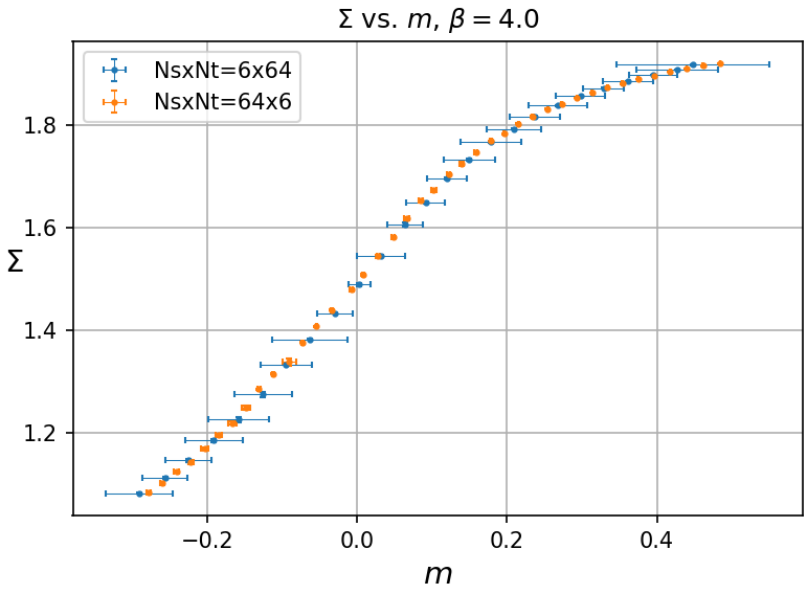

Figure 1: Symmetry of the chiral condensate by the interchange of N_s with N_t

Taking advantage of this symmetry and regarding that most of the simulations that I have run were in the δ-regime, I was able to use the results on the 5×64, 64×6, 7×64, 8×64, 9×64, 64×10, 11×64, 64×12 and 64×16 lattices to make the following plots at finite temperature, where a comparison of the chiral condensate obtained using the prediction by Hosotani and lattice simulations is shown, together with their correlation.

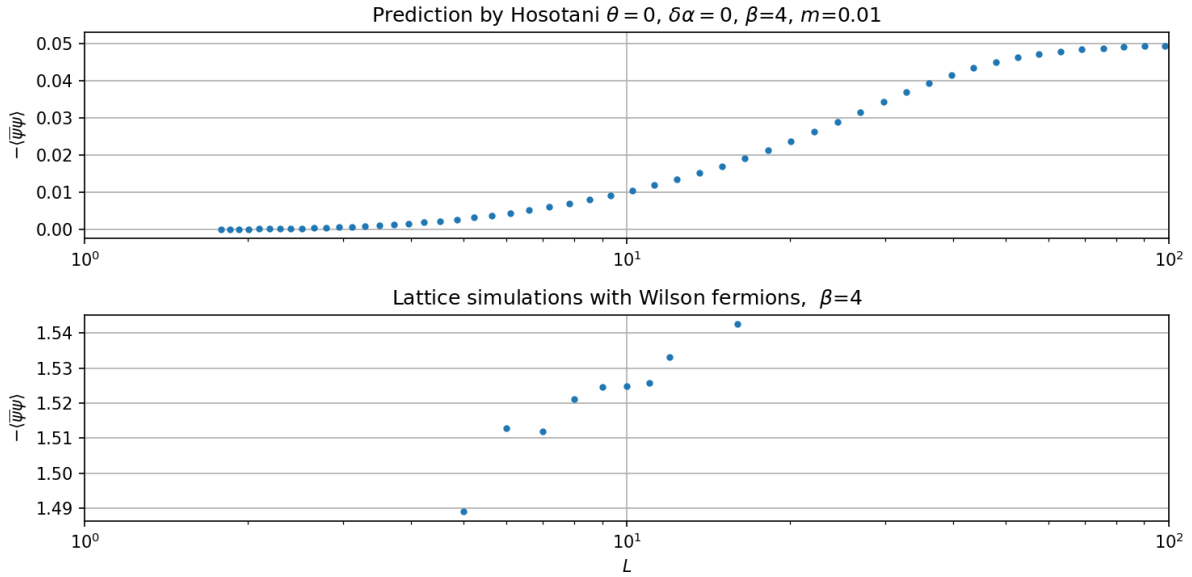

Figure 2: Comparison of the chiral condensate obtained through the prediction by Hosotani and by lattice simulations using Wilson fermions. $m = 0.01$; L can be related to N_t in the lattice

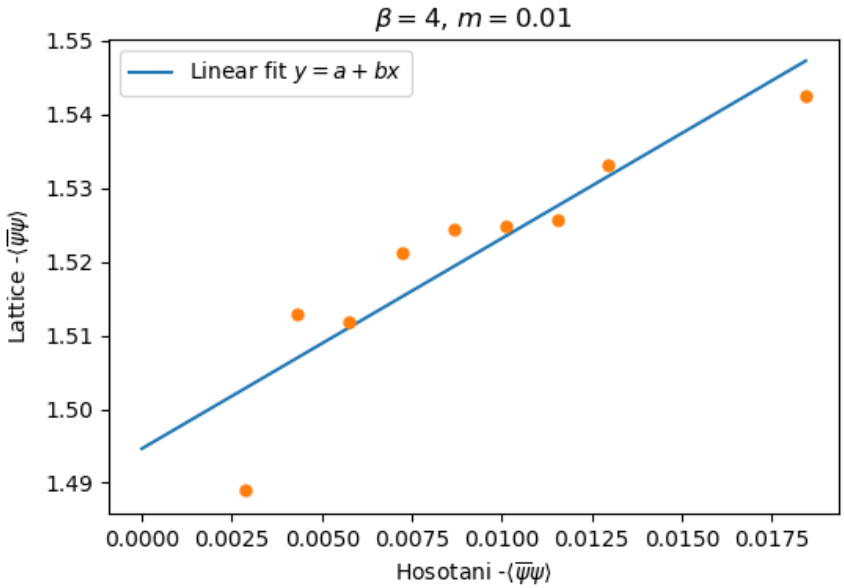

Figure 3: Correlation between the chiral condensate calculated through the prediction by Hosotani and the one obtained through lattice simulations. The parameters are $a = 1.4946 \pm 0.005$, $b = 2.8549 \pm 0.4965$. Correlation coefficient $r = 0.9084$

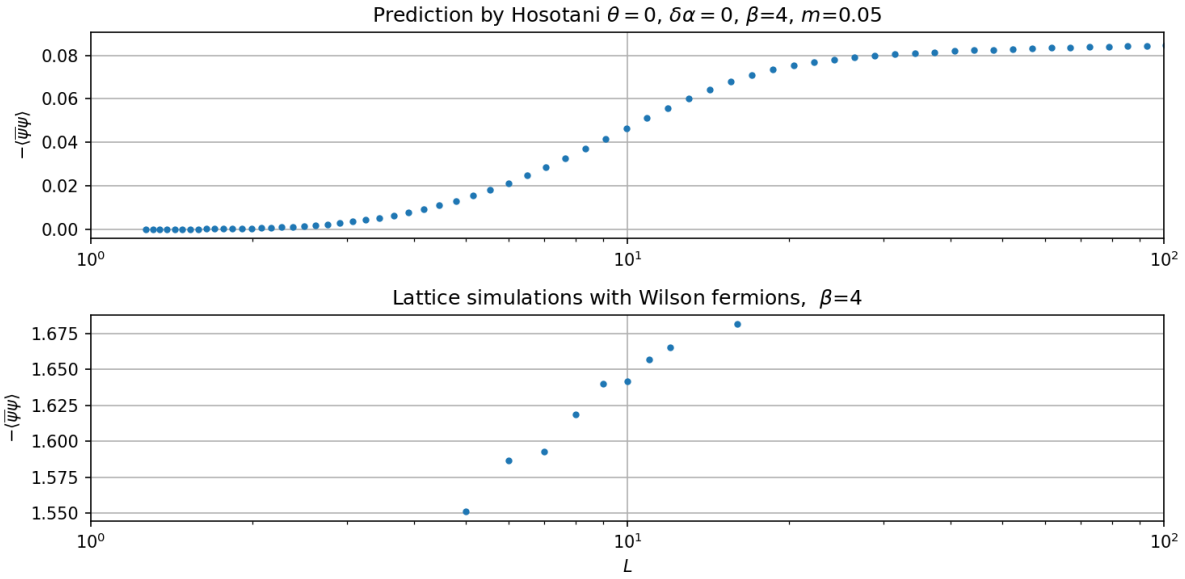

Figure 4: Comparison of the chiral condensate obtained through the prediction by Hosotani and by lattice simulations using Wilson fermions. $m = 0.05$; L can be related to N_t in the lattice

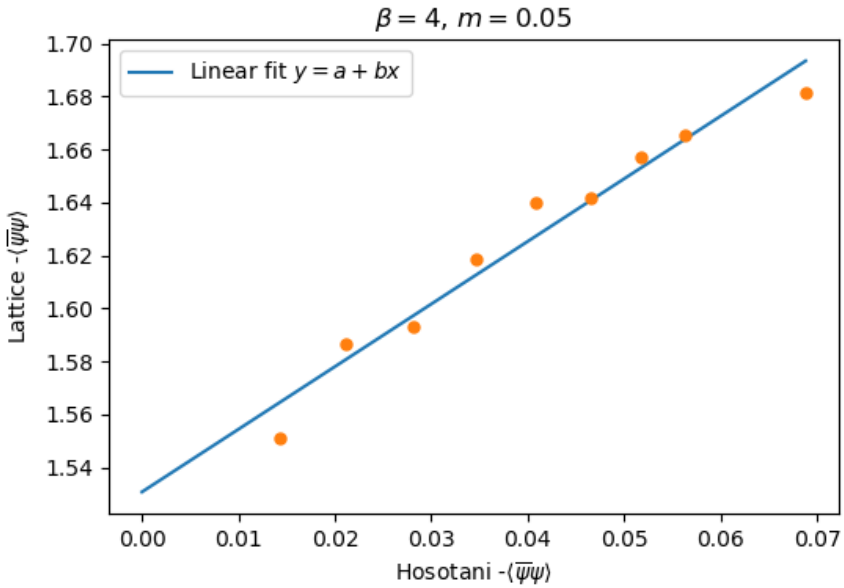

Figure 5: Correlation between the chiral condensate calculated through the prediction by Hosotani and the one obtained through lattice simulations. The parameters are $a = 1.5307 \pm 0.0081$, $b = 2.3644 \pm 0.1852$. Correlation coefficient $r = 0.9792$

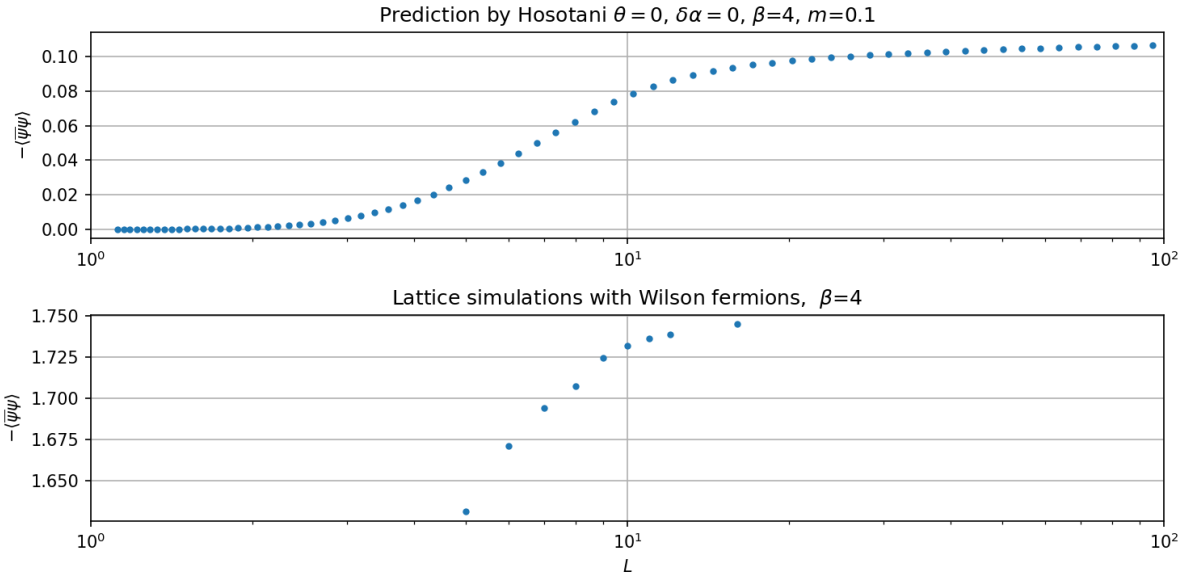

Figure 6: Comparison of the chiral condensate obtained through the prediction by Hosotani and by lattice simulations using Wilson fermions. $m = 0.1$; L can be related to N_t in the lattice

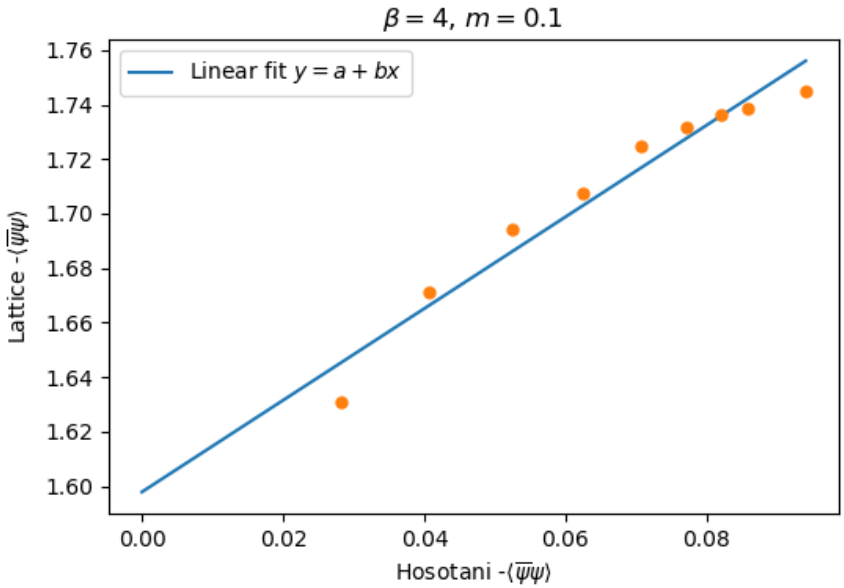

Figure 7: Correlation between the chiral condensate calculated through the prediction by Hosotani and the one obtained through lattice simulations. The parameters are $a = 1.5979 \pm 0.0097$, $b = 1.681 \pm 0.1402$. Correlation coefficient $r = 0.9765$

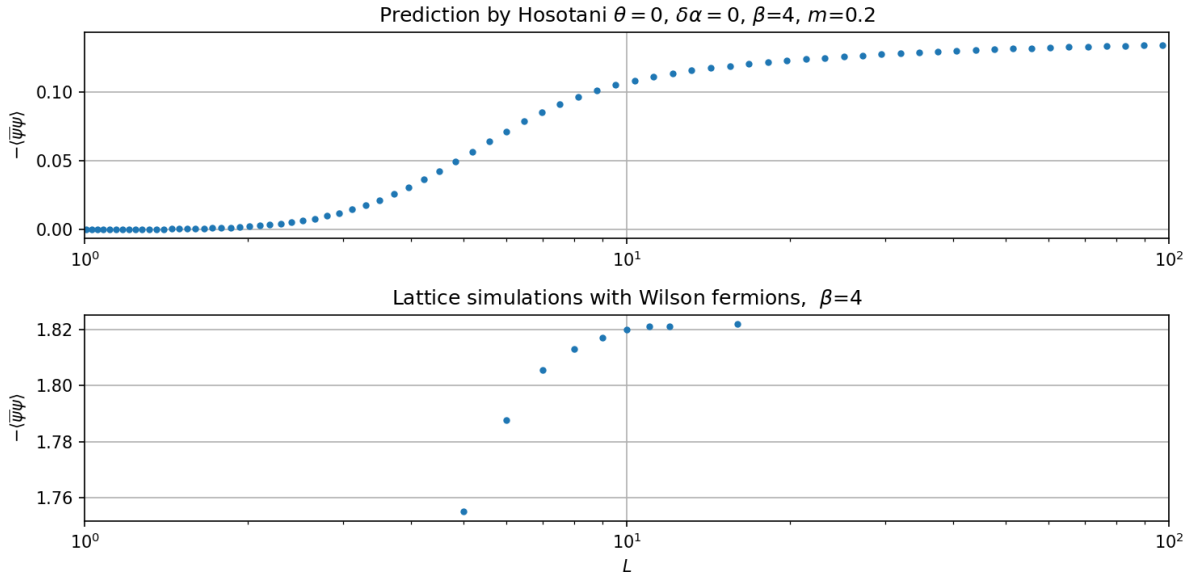

Figure 8: Comparison of the chiral condensate obtained through the prediction by Hosotani and by lattice simulations using Wilson fermions. $m = 0.2$; L can be related to N_t in the lattice

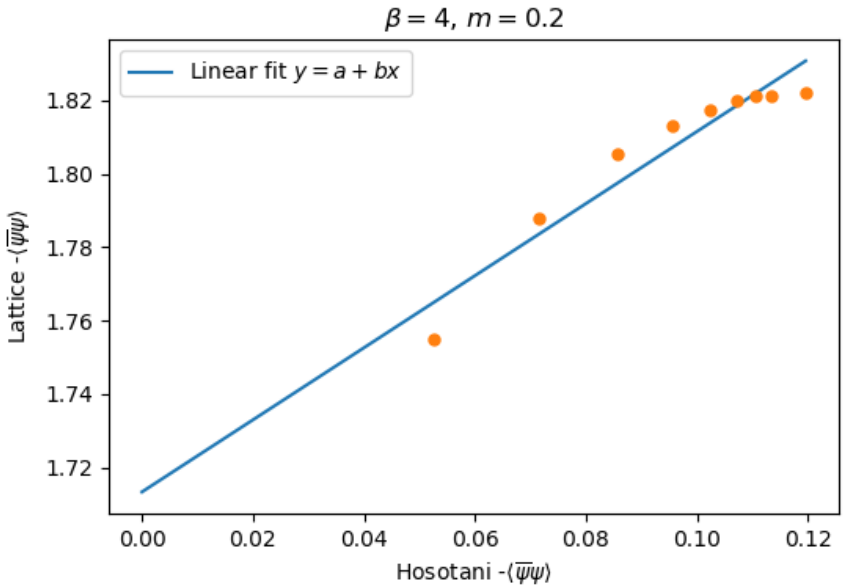

Figure 9: Correlation between the chiral condensate calculated through the prediction by Hosotani and the one obtained through lattice simulations. The parameters are $a = 1.7133 \pm 0.0106$, $b = 0.9817 \pm 0.1088$. Correlation coefficient $r = 0.9596$

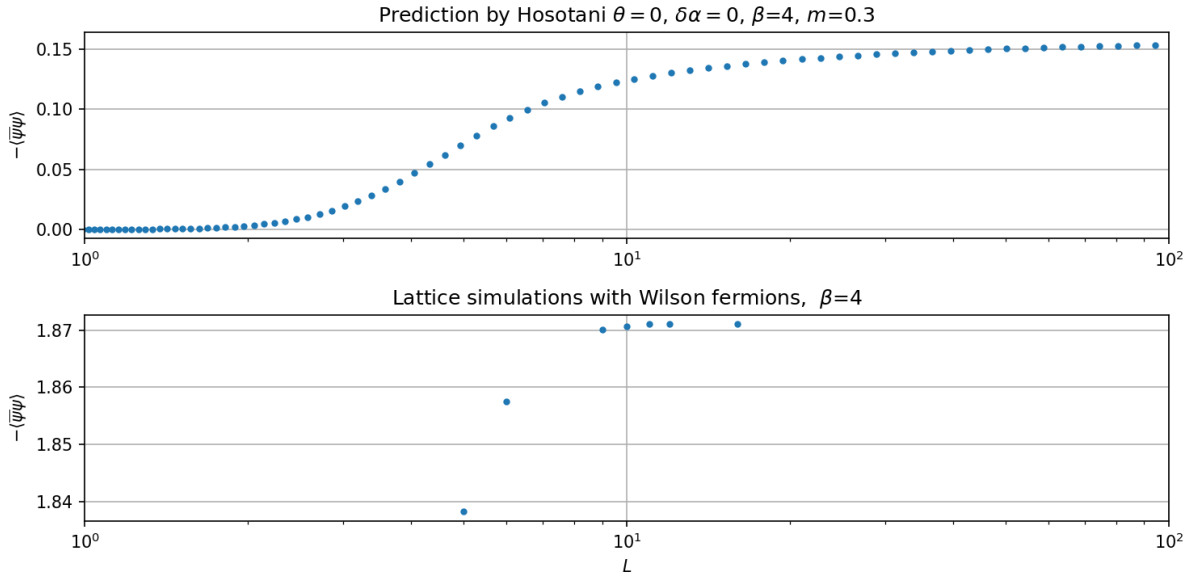

Figure 10: Comparison of the chiral condensate obtained through the prediction by Hosotani and by lattice simulations using Wilson fermions. $m = 0.3$; L can be related to N_t in the lattice

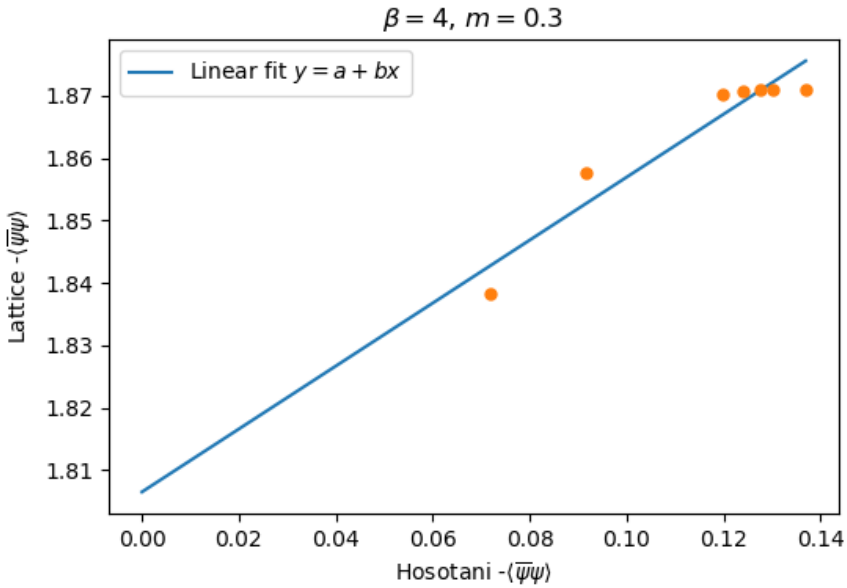

Figure 11: Correlation between the chiral condensate calculated through the prediction by Hosotani and the one obtained through lattice simulations. The parameters are $a = 1.8065 \pm 0.0079$, $b = 0.5043 \pm 0.068$. Correlation coefficient $r = 0.9574$