Exercises

- Starting from the SU(N) Yang-Mills action in the non-interacting limit, g=0, do the mode expansion and the Gaussian path integral to compute the gluonic contribution to the pressure.

  Does your result match the quoted one from the lecture? What is required to get the correct result?

  Do you expect the same issue on the lattice?

- Prove that the lattice partition function of pure gauge theory with a compact and periodic time direction is indeed exactly $Z = \hat{T}\mathrm{r}(T^{N_\tau})$

- Give the spectral decomposition of the thermal expectation value of a correlation function $\langle O^\dagger(\tau_1)O(\tau_2)\rangle$, and from there the vacuum expectation value $\langle 0|O^\dagger(\tau_1)O(\tau_2)|0\rangle$

- Look closely at the plot of the flavour dependence of the pressure. Can you explain qualitatively why the curves "move to the left" with every addition of light fermions?