Quantum field theory II	**Exercise sheet 5**

Basic properties of Yang-Mills theory

Exercise 1: Let us inspect some important properties of SU(N_c).

(a) Let $U(x)$ be a field which takes values in SU(N_c). Show that $\mathrm{tr}\,[\partial_\mu U U^\dagger] = 0$.

(b) Let f^{abc} be the structure constants of SU(N_c), as defined in the script. Show that f^{abc} is antisymmetric in all permutations of indices.

Exercise 2: Let us consider "pure Yang-Mills theory", defined by the Lagrangian

$$\mathcal{L}_M \equiv -\frac{1}{4} F^{a\mu\nu} F^a_{\mu\nu} \,.$$

Determine the corresponding classical equations of motion.