

1. Let  $f_M(x) = C \exp(-\frac{1}{2}\langle x, Mx \rangle)$  be a probability distribution over  $\mathbb{R}^n$ . Show that

$$C = \sqrt{\frac{\text{Det } M}{(2\pi)^n}}$$

2. Show that the quadratic matrix of a marginal distribution of  $f_M$  is a Schur complement of  $M$ .
3. Define the Boltzman entropy of a distribution by  $h(f) = - \int f(x) \log(f(x)) dx$ . Calculate  $h(f_M)$ .

Deadline: Dec 1.