Title: Existence of the gradient for solutions of some Hypoelliptic Dirichlet problems (paper in collaboration of Luciano Tubaro).

Abstract: We are concerned with a Cauchy--Dirichlet problem on a bounded open convex subset O of Rd: $D_t u(t,x) = 1/2 \text{Trace}[C D_x^2 u(t,x)] + \langle Ax, D_x u(t,x) \rangle$, $u(0,x) = f(x)$ (1). A and C are dXd matrices with C semi definite positive and det C=0. We assume that the problem is Hypoelliptic. As well known the formal solution u(t,x),of (1) is given by a stopped semigroup. We prove a new rprobabilistic representation formula for the gradient of u(t,x) for t>0, The main tools are a suitable translation on the Girsanov formula, the Ehrhard inequality and the Helly selection principle .