Solvability of some integro-differential equations with drift and superdiffusion

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We establish the existence in the sense of sequences of solutions for some integro-differential type equations containing the drift term and the square root of the one dimensional negative Laplacian, on the whole real line or on a finite interval with periodic boundary conditions in the corresponding H^2 spaces. The argument relies on the fixed point technique when the elliptic equations involve first order differential operators with and without Fredholm property. It is proven that, under the reasonable technical assumptions, the convergence in L^1 of the integral kernels implies the existence and convergence in H^2 of solutions.