Parabolic estimates and Poisson process

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We show how knowing Schauder or Sobolev-space estimates for the one-dimensional heat equation allows one to derive their multidimensional analogs for equations with coefficients depending only on time variable with the same constants as in the case of the one-dimensional heat equation. The method is quite general and is based on using the Poisson stochastic process. We will also present other applications of the method. It looks like no other method is available at this time and it is a very challenging problem to find a purely analytic approach to proving such results. This is a joint work with N.V. Krylov.