Fundamental solution of second-order parabolic equations in non-divergence form

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ABSTRACT

We study Fundamental solution for non-divergence form parabolic equations in cylindrical domains. Fundamental solution play an important role in studying parabolic equations. When the coefficients are sufficiently smooth, say Hölder continuous, then the existence and pointwise estimates of Fundamental solution are well established. However, when the coefficients are merely continuous, then Fundamental solutions do not necessarily exist as functions. We show that when the mean oscillation of the coefficients satisfies the Dini condition, then the Fundamental solution exist. We also establish the Gaussian bounds for the Fundamental solution. This work presents a unified approach valid for both the scalar and vectorial cases.