Stein’s Method of Exchangeable Pairs with Application to the Curie-Weiss Model

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Let \((W, W')\) be an exchangeable pair. Assume that 
\[ E(W - W'|W) = g(W) + r(W), \]
where \(g(W)\) is a dominated term while \(r(W)\) is negligible. Let
\[ G(t) = \int_0^t g(s)ds \]
and define
\[ p(t) = c_1 e^{-c_0 G(t)}, \]
where \(c_0\) is a properly chosen constant and \(c_1 = 1/\int_{-\infty}^{\infty} p(t)dt\). Let \(Y\) be a random variable with the probability density function \(p\). In this talk we shall proved that \(W\) converges to \(Y\) in distribution under certain regular conditions. A Berry-Esseen type bound is also given. An application to the Curie-Weiss model will be discussed. The talk is based on a joint work with Sourav Chatterjee.