Exponential Inequalities via Exchangeable Pair Approach
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Let \((W, W')\) be an exchangeable pair with \(E(W - W' | W) = g(W)\), and let \(v(W) = E(||(g(W) - g(W'))(W - W')|| | W)\). Assume that there exist \(c_0, c_1 \geq 0, c_2 \geq 1\) such that \(P(v(W) \geq c_0 + t) \leq c_2 e^{-t/c_1}\) for \(t \geq 0\). In this talk we shall prove that

\[
P(g(W) \geq t) \leq \exp\left(-\frac{t^2}{2\tau + 4t\sqrt{2c_1}}\right),
\]

where \(\tau = c_0 + c_1 \log(4c_2)\). An application to Curie-Weiss model will also be discussed.