Smile at the Boundary Layer

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Abstract / Resumo:
We look at the details of the derivation of the second order terms in the asymptotic expansions for European option prices and implied volatilities for fast mean-reverting correlated stochastic volatility models. The derivation involves a boundary layer analysis which we treat probabilistically, and illustrate numerically with the Heston model. These results are included in the book "Multiscale Stochastic Volatility for Equity, Interest-Rate and Credit Derivatives" by J.-P. Fouque, G. Papanicolaou, R. Sircar, and K. Solna