CALIBRATION TO AMERICAN OPTIONS WITH THE REDUCED BASIS METHOD

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We consider a calibration problem on option prices, with the focus on American put options. This problem is described by a least squares minimization problem with parabolic variational inequalities as constraints. Taking into consideration that these options do not admit a closed-form expansion, the calibration routine becomes computationally demanding and, in some cases, not feasible for practical applications. In order to accelerate the process, appropriate model reduction strategies can be utilized. We present a reduced basis method (RBM) as a fast and efficient approach for calibration on American options. Additionally, we compare this methodology to alternative methods which are common in practice, particularly, we consider the so-called De-Americanization method. Our comparative study is supported by numerous experiments on synthetic as well as market data sets and the advantages of each method are described for different scenarios. For our numerical experiments we consider a Heston stochastic volatility model.