A Simple Users Guide of the code APOh

For the detailed mathematical formulas, please refer to Chapter 13 of the book: *Liao, S.J., Homotopy Analysis Method in Nonlinear Differential Equations. Springer (2011).*

APOh[order_] This module gives the homotopy-approximation of dimensional optimal exercise price $B(\tau)$, with order denoting the order of homotopy-approximation. The code first reads the data-file APO-48-10.txt, then asks the user to input strike price X, risk-free interest rate r, volatility σ and time to expiration T (year), and finally lists the results of $B(\tau)$ at different order of approximations, their modified approximations by the Padé method, and plots a curve of $B(\tau)$ in the interval $0 \le \tau \le 1.25T$ with the theoretical perpetual optimal exercise price $B_p = X\gamma/(1+\gamma)$. To begin a new case, simply run the code APOh once again and input new parameters.

B[n] The nth-order homotopy-approximation of the optimal exercise price with dimension (\$), a polynomial of $\sqrt{\tau}$ to $o(\tau^M)$, where $M = \text{OrderTaylor}$.

Bpade[n] The $[M, M]$ Padé approximant of the nth-order homotopy approximation of $B(\tau)$ in polynomial of $\sqrt{\tau}$ to $o(\tau^M)$, where $M = \text{OrderTaylor}$.

OrderHAM The highest order of homotopy-approximations of the dimensionless results in the data file APO-48-10.txt. Its defaults is 10 in the data file APO-48-10.txt.

OrderTaylor The order of $B(\tau)$ in polynomial of $\sqrt{\tau}$. Its defaults is 48 in the data file APO-48-10.txt.

Bp The perpetual optimal exercise price $B_p = X\gamma/(1+\gamma)$.