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fd_gauss_vasicek1d_capfloor

Input parameters:

- Space StepNumber N_r
- Time StepNumber M

Output parameters:

- Price

The stochastic differential equation representing the short rate is given by

$$dr_t = k(\theta - r_t)dt + \sigma\, dW(t)$$

The price of the zero-coupon bond with maturity S>T is solution of the following PDE

$$u_t + \frac{1}{2}\sigma^2 u_{rr} + [k(\theta - r)]u_r - ru = 0 u(r, S, S) = 1$$

that we solve using Cranck-Nicholson scheme. We apply Dirichlet boundary conditions at $r = r_{min}$ and $r = r_{max}$. The price of the option is obtained solving the same PDE with boundary condition at the maturity of the option T, the price of the Zero Coupon Bond. A cap(floor) is equivalent to a portfolio of European zero-coupon Put(Call)-Options.

References