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cf_vasicek1d_payerswaption

Output parameters:

- Price

The stochastic differential equation representing the the shor rate is given by

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

The price of the zero-coupon bond is given by

$$P(t,T) = A(t,T)e^{-B(t,T)\,r(t)}.$$

where

$$A(t,T) = e^{(\theta - \frac{\sigma^2}{2k^2})(B(t,T)-T+t) - \frac{\sigma^2}{4k}B(t,T)^2}$$

and

$$B(t,T) = \frac{1}{k}(1 - e^{-k(T-t)})$$

The price of the coupon bearing is obtained as linear combination of zero-coupon prices. A swaption can also be seen as an option of strike 1 over a certain coupon bearing.

References