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## cf\_cir1d\_zcbond

Output parameters:

- Price

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

$$dr_t = k(\theta - r_t)dt + \sigma \sqrt{r_t}dW(t)$$

The price of the zero-coupon bond is given by

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

where

$$h = \sqrt{k^2 + 2\sigma^2}$$

$$A(t, T) = \left( \frac{2he^{(k+h)(T-t)/2}}{2h + (k+h)(e^{h(T-t)} - 1)} \right)^{\frac{2k\theta}{\sigma^2}}$$

and

$$B(t, T) = \frac{2(e^{h(T-t)} - 1)}{2h + (k+h)(e^{h(T-t)} - 1)}$$

## References