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# hullwhite1d

## 1 Description

Hull and White models [1] are defined by an EDS which describes the evolution of the spot rate  $r(t)$ :

$$\begin{cases} dx(t) = -a x(t) dt + \sigma dW(t), & x(0) = 0 \\ r(t) = x(t) + \phi(t). \end{cases}$$

Where the function  $\phi$  is a deterministic function totally given by the market values of the zero coupon bonds.

## 2 Code Implementation

```
#ifndef _HullWhite1D_H
#define _HullWhite1D_H

#include "optype.h"
#include "var.h"
#include "error_msg.h"
#include "enums.h"

#define TYPEMOD HullWhite1D

/*1D HULL-WHITE World*/
typedef struct TYPEMOD
{
    VAR T;
    VAR flat_flag;
    VAR a;
```

```
    VAR Sigma;  
} TYPEMOD;  
  
extern double MOD(GetYield)(TYPEMOD *pt);  
extern char *MOD(GetCurve)(TYPEMOD *pt);  
  
#endif
```

## References

- [1] J.Hull and A.WHITE. One factor interest rate models and the valuation of interest rate derivative securities. *Journal of Financial and Quantitative Analysis*, 28:235–254, 1993. 1