

# cirpp1d

## 1 Description

CIR++ models are defined by an EDS which describes the evolution of the spot rate  $r(t)$ :

$$\begin{cases} dx(t) = a(b - x(t)) dt + \sigma \sqrt{x(t)} dW(t), & x(0) = x_0 \\ r(t) = x(t) + \phi(t). \end{cases}$$

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

## 2 Code Implementation

```
#ifndef _CirPlus1D_H
#define _CirPlus1D_H

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

#define TYPEMOD CirPP1D

/*1D Cir++ World*/
typedef struct TYPEMOD
{
    VAR T;
    VAR flat_flag;
    VAR a;
```

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