Source | Model Presentation

affine3d

1 Description

Three factor affine model is defined by an EDS which describes the evolution of the spot rate r_t.
The instantaneous short rate r_t is defined as a linear combination of 3 factors, $r(t) = \delta + \sum_{j=1} 3x_j(t)$, described by Markov processes $x_j(t)$, $j = 1, 2, 3$, following a Gaussian model:

$$dx_j(t) = -k_j x_j(t)dt + \sigma_j dW_j(t), \qquad j = 1, 2, 3,$$

where:

- δ, k_j, σ_j, are constants for all the factors.
- $W_j(t)$, $j = 1, 2, 3$ are three Brownian motions (under the risk-neutral measure) which are dependent with each other, with instantaneous correlation coefficients ρ_{ij}, for $i, j = 1, 2, 3$.

2 Code Implementation

```
#ifndef _Affine3D_H
#define _Affine3D_H

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

#define TYPEMOD Affine3D

/*3D Affine World*/
typedef struct TYPEMOD{
```

```
  VAR T;
  VAR x01;
  VAR x02;
  VAR x03;
  VAR k1;
  VAR k2;
  VAR k3;
  VAR Sigma1;
  VAR Sigma2;
  VAR Sigma3;
  VAR shift;
  VAR Rho12;
  VAR Rho13;
  VAR Rho23;
} TYPEMOD;


#endif
```