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# timehes1d

## 1 Description

This model is given by,

$$\begin{aligned} dS_t &= rS_t dt + \sqrt{v_t} S_t dW_t^1, \\ dv_t &= k(\theta_t - v_t) dt + \sigma_t \sqrt{v_t} dW_t^2, \end{aligned}$$

where  $W^1$  and  $W^2$  are two correlated brownian motions with  $d \langle W^1, W^2 \rangle_t = \rho_t dt$ , and  $k$  is constant and  $\theta_t$  and  $\sigma_t$  and  $\rho_t$  are piecewise constants functions.

## 2 Code Implementation

```
#ifndef _TIMEHES1D_H
#define _TIMEHES1D_H

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

#define TYPEMOD TIMEHES1D

/*1D TIME DEPENDENT HESTON World*/

typedef struct TYPEMOD
{
    VAR T;
    VAR SO;
    VAR Divid;
    VAR R;
    VAR Sigma0;
```

```
VAR MeanReversion;  
VAR TimeDepParameters;  
VAR TimeStep;  
} TYPEMOD;
```

```
#endif
```