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#if defined(PremiaCurrentVersion) && PremiaCurrentVersion < (2010+2) //The "#els
#else

#ifndef HW1DGCALIBRATION_H_INCLUDED
#define HW1DGCALIBRATION_H_INCLUDED

#include "pnl/pnl_vector.h"
#include "
href../../../../common/math/InterestRateModelTree/TreeHW1dGeneralized/TreeHW1dGener
#include "
href../../../../common/math/read_market_zc/InitialYieldCurve_h_src.pdfmath/read_mar

typedef struct MktATMCapletVolData
{
    double Periodicity;
    PnlVect *CapletMaturity;    // Vector of the maturities
    PnlVect *CapletVolatility;  // Vector of Caplet Volatilities for every maturit

    int NbrData;    // Number of values read in the file.
} MktATMCapletVolData;

// Compute price of caplet in Black Model
double black_caplet_price(ZCMarketData *ZCMarket, double vol_impli, double caplet_p

// Compute the implied volatility for caplet in Black Model implied by caplet pr
double bk_caplet_vol_implied_newton(ZCMarketData *ZCMarket, double caplet_price,

// Compute price of caplet in HW1dG Model
double hw1dg_caplet_price(ZCMarketData *ZCMarket, double vol_avg, double caplet_

// Compute price of floorlet in HW1dG Model
double hw1dg_floorlet_price(ZCMarketData *ZCMarket, double vol_avg, double caplet_

// Compute the average volatility of forward ZC bond in HW1dG Model implied by a
double hw1dg_fwd_zc_vol_implied_newton(ZCMarketData *ZCMarket, double caplet_pri

// From a vector of Black volatilities of caplets, read from market, we compute
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void From_Black_To_HW1dG_volatility(ZCMarketData *ZCMarket, MktATMCapletVolData

// Compute the volatility function of HW1dG Model that makes the model prices o
// The volatility function of HW1dG Model is supposed to be piecewise constant
int hw1dg_calibrate_volatility(ModelHW1dG *HW1dG_Parameters, ZCMarketData *ZCMar

// Price of ZC bond at time "t", maturing at time "T", knowing the yield curve at
double DiscountFactor(ZCMarketData *ZCMarket, ModelHW1dG *HW1dG_Parameters, doub

// Compute average volatility of forward ZC bond in HW1dG Model.
double hw1dg_fwd_zc_average_vol(ModelHW1dG *HW1dG_Parameters, double T, double S

// Compute price of put option on ZC bond in HW1dG Model.
double hw1dg_zc_put_price(ZCMarketData *ZCMarket, ModelHW1dG *HW1dG_Parameters,

// Compute price of call option on ZC bond in HW1dG Model.
double hw1dg_zc_call_price(ZCMarketData *ZCMarket, ModelHW1dG *HW1dG_Parameters,

///***** Read the caplet volatilities from file ****

void ReadCapletMarketData(MktATMCapletVolData *MktATMCapletVol, int CapletCurve)

int DeleteMktATMCapletVolData(MktATMCapletVolData *MktATMCapletVol);

#endif // HW1DGCALIBRATION_H_INCLUDED
#endif //PremiaCurrentVersion

```