Help

```c
#ifndef _MC_LMM_GLASSERMAN_ZHAO_H
#define _MC_LMM_GLASSERMAN_ZHAO_H

#include "optype.h"
#include "numfunc.h"
#include "pnl/pnl_mathtools.h"
#include "pnl/pnl_random.h"
#include "pnl/pnl_cdf.h"


#include "math/lmm/lmm_libor.h"
#include "math/lmm/lmm_products.h"
#include "math/lmm/lmm_volatility.h"
#include "math/lmm/lmm_numerical.h"
#include "math/lmm/lmm_zero_bond.h"


/** "Arbitrage-Free Discretization Of Lognormal Forward
    Libor Model" by Glasserman and Zhao (2000)
* We consider a tenor structure 0=T_0 < T_1 < ... < T_N <
    T_N+1 equaly spaced
* and Libor rates L(t, T_0), L(t,T_2),..., L(t, T_N) for a
    certain date t. L(., T_i) is set at Ti and payed at Ti+ten
    or.
* Convention: for t>T_i L(t,T_i)=L(T_i,T_i)
* Simulation can be done with the function "Sim_Libor_Glass
    erman" under two measure : Terminal measure and Spot measu
    re.
* flag_numeraire=0 -> Terminal measure
* flag_numeraire=1 -> Spot measure
*/

void Sim_Libor_Glasserman(int start_index, int end_index,
    Libor *ptLOld, Volatility *ptVol, int generator, int NbrMCsimu
    lation, int NbrStepPerTenor, int save_all_paths, PnlMat *
    LiborPathsMatrix, int save_brownien, PnlMat *BrownianMatrix
    Paths, int flag_numeraire);

int Sim_Libor_Glasserman_TerminalMeasure(int start_index,
    int end_index, Libor *ptLOld, Volatility *ptVol, int      generator, int NbrM
    paths, PnlMat *LiborPathsMatrix, int save_brownien, PnlMat *Br
```

```
    ownianMatrixPaths);

double Swaption_Payoff_TerminalMeasure(Libor *ptL, Swaptio
    n *ptSwpt, NumFunc_1 *p);

int Sim_Libor_Glasserman_SpotMeasure(int start_index, int
    end_index, Libor *ptLOld, Volatility *ptVol, int generator,
    int NbrMCsimulation, int NbrStepPerTenor, int save_all_paths,
     PnlMat *LiborPathsMatrix, int save_brownien, PnlMat *Brow
    nianMatrixPaths);

double Swaption_Payoff_SpotMeasure(Libor *ptL, Swaption *pt
    Swpt, NumFunc_1 *p);

double Swaption_Payoff_Discounted(Libor *ptL, Swaption *pt
    Swpt, NumFunc_1 *p, int flag_numeraire);

double european_swaption_ap_rebonato(double valuation_date,
     NumFunc_1 *p, Libor *ptLib, Volatility *ptVol, Swaption *
    ptSwpt);

double Numeraire(int i, Libor *ptLib_current, int flag_
    numeraire);

/////////////////////////////

void MC_ExoticProduct_LongstaffSchwartz(char* CouponFlag,
    PnlVect *ContractParams, double *LS_Price, double first_exe
    rcise_date, double last_payement_date, double Nominal, int
    NbrMCsimulation, Libor *ptLib, Volatility *ptVol, int      generator, int bas
    flag_numeraire);
#endif
```

References