

[Help](#)

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#include <stdlib.h>
#include "hullwhite1d_std.h"
#include "hullwhite1d_includes.h"

//The "#else" part of the code will be freely available after the (year of creat
#if defined(PremiaCurrentVersion) && PremiaCurrentVersion < (2007+2)
int CALC(CF_CapHW1D)(void *Opt, void *Mod, PricingMethod *Met)
{
    return AVAILABLE_IN_FULL_PREMIA;
}
static int CHK_OPT(CF_CapHW1D)(void *Opt, void *Mod)
{
    return NONACTIVE;
}
#else

/** Cap price as a combination of ZC Put option prices
static int cf_cap1d(int flat_flag, double r_t, char *curve, double a, double sig
{

    double sum, tim, tip, strike_put;
    int i, nb_payment;
    ZCMarketData ZCMarket;

    /* Flag to decide to read or not ZC bond datas in "initialyields.dat" */
    /* If P(0,T) not read then P(0,T)=exp(-r0*T) */
    if (flat_flag == 0)
    {
        ZCMarket.FlatOrMarket = 0;
        ZCMarket.Rate = r_t;
    }

    else
    {
        ZCMarket.FlatOrMarket = 1;
        ZCMarket.filename = curve;
        ReadMarketData(&ZCMarket);

        if (contract_maturity > GET(ZCMarket.tm, ZCMarket.Nvalue - 1))

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        {
            printf("\ nError : time bigger than the last time value entered in ini
            exit(EXIT_FAILURE);
        }
    }

    strike_put = 1. / (1 + periodicity * K);
    nb_payment = (int)((contract_maturity - first_payment) / periodicity);

    /*Cap=Portfolio of zero-bond Put options*/
    sum = 0.;
    for (i = 0; i < nb_payment; i++)
    {
        tim    = first_payment + (double)i * periodicity;
        tip    = tim + periodicity;

        sum    += cf_hw1d_zbput(&ZCMarket, a, sigma, tip, tim, strike_put);
    }

    sum = Nominal * (1. + K * periodicity) * sum;

    /*Price*/
    *price = sum;

    DeleteZCMarketData(&ZCMarket);

    return OK;
}

int CALC(CF_CapHW1D)(void *Opt, void *Mod, PricingMethod *Met)
{
    TYPEOPT *ptOpt = (TYPEOPT *)Opt;
    TYPEMOD *ptMod = (TYPEMOD *)Mod;

    return cf_cap1d(ptMod->flat_flag.Val.V_INT,
                    MOD(GetYield)(ptMod),
                    MOD(GetCurve)(ptMod),
                    ptMod->a.Val.V_DOUBLE,
                    ptMod->Sigma.Val.V_PDOUBLE,
                    ptOpt->Nominal.Val.V_PDOUBLE,

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        ptOpt->FixedRate.Val.V_PDOUBLE,
        ptOpt->ResetPeriod.Val.V_DATE,
        ptOpt->FirstResetDate.Val.V_DATE - ptMod->T.Val.V_DATE,
        ptOpt->BMaturity.Val.V_DATE - ptMod->T.Val.V_DATE,
        &(Met->Res[0].Val.V_DOUBLE));
    }
    static int CHK_OPT(CF_CapHW1D)(void *Opt, void *Mod)
    {
        return strcmp(((Option *)Opt)->Name, "Cap");
    }
    #endif //PremiaCurrentVersion

static int MET(Init)(PricingMethod *Met, Option *Opt)
{
    if (Met->init == 0)
    {
        Met->init = 1;
    }

    return OK;
}

PricingMethod MET(CF_CapHW1D) =
{
    "CF_HullWhite1d_Cap",
    {{" ", PREMIA_NULLTYPE, {0}, FORBID}},
    CALC(CF_CapHW1D),
    {{"Price", DOUBLE, {100}, FORBID}, {" ", PREMIA_NULLTYPE, {0}, FORBID}},
    CHK_OPT(CF_CapHW1D),
    CHK_ok,
    MET(Init)
} ;

```