

[Help](#)

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#include "
href../../../../mod/sg1d/sg1d_std/sg1d_std_h_src.pdfsg1d_std.h"
#include "
href../../../../common/math/read_market_zc/InitialYieldCurve_h_src.pdfmath/read_mar
#include "
href../../../../mod/sg1d/sg1d_std/QuadraticModel_h_src.pdfQuadraticModel.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_CapSG1D)(void *Opt, void *Mod, PricingMethod *Met)
{
    return AVAILABLE_IN_FULL_PREMIA;
}
static int CHK_OPT(CF_CapSG1D)(void *Opt, void *Mod)
{
    return NONACTIVE;
}
#else

/// Cap price as a combination of ZC Put option prices
static int cf_cap_sg1d(int flat_flag, double r_t, char *curve, double beta, doub
{
    double sum, T, S, 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);
    }
}
```

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        if (contract_maturity > GET(ZCMarket.tm, ZCMarket.Nvalue - 1))
        {
            printf("\ nError : time bigger than the last time value entered in ini
            exit(EXIT_FAILURE);
        }
    }

    strike_put = 1. / (1 + periodicity * K);
    nb_payement = (int)((contract_maturity - first_payement) / periodicity);

    /*Cap=Portfolio of zero-bond Put options*/
    sum = 0.;
    for (i = 0; i < nb_payement; i++)
    {
        T = first_payement + (double)i * periodicity;
        S = T + periodicity;

        sum += zb_put_quad1d(&ZCMarket, beta, sigma, T, S, strike_put);
    }

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

    /*Price*/
    *price = sum;

    DeleteZCMarketData(&ZCMarket);

    return OK;
}

int CALC(CF_CapSG1D)(void *Opt, void *Mod, PricingMethod *Met)
{
    TYPEOPT *ptOpt = (TYPEOPT *)Opt;
    TYPEMOD *ptMod = (TYPEMOD *)Mod;

    return cf_cap_sg1d(ptMod->flat_flag.Val.V_INT,
                        MOD(GetYield)(ptMod),
                        MOD(GetCurve)(ptMod),
                        ptMod->a.Val.V_DOUBLE,

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        ptMod->Sigma.Val.V_PDOUBLE,
        ptOpt->Nominal.Val.V_PDOUBLE,
        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_CapSG1D)(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;
        Met->HelpFilenameHint = "cf_quadratic1d_cap";
    }

    return OK;
}

PricingMethod MET(CF_CapSG1D) =
{
    "CF_SquareGaussian1d_Cap",
    {" ", PREMIA_NULLTYPE, {0}, FORBID}},
    CALC(CF_CapSG1D),
    {"Price", DOUBLE, {100}, FORBID}, {" ", PREMIA_NULLTYPE, {0}, FORBID}},
    CHK_OPT(CF_CapSG1D),
    CHK_ok,
    MET(Init)
} ;

```