

[Help](#)

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#include "bs2d_std2d.h"
#include "pnl/pnl_cdf.h"

static int ExchangeAn(double s1, double s2, double ratio, double t,
                     double r, double divid1, double divid2,
                     double sigma1, double sigma2, double rho,
                     double *ptprice, double *ptdelta1, double *ptdelta2)
{
    double b1, b2, sigma, d1, d2;

    b1 = r - divid1;
    b2 = r - divid2;
    sigma = sqrt(SQR(sigma1) + SQR(sigma2) - 2.0 * rho * sigma1 * sigma2);
    d1 = (log(s1 / (s2 * ratio)) + (b1 - b2 + SQR(sigma) / 2.0) * t) / (sigma * sqrt(t));
    d2 = d1 - sigma * sqrt(t);

    /*Price*/
    *ptprice = s1 * exp((b1 - r) * t) * cdf_nor(d1) - ratio * s2 * exp((b2 - r) * t) * cdf_nor(d2);

    /*Deltas*/
    *ptdelta1 = exp((b1 - r) * t) * cdf_nor(d1);
    *ptdelta2 = -ratio * exp((b2 - r) * t) * cdf_nor(d2);

    return OK;
}

int CALC(CF_Exchange)(void *Opt, void *Mod, PricingMethod *Met)
{
    TYPEOPT *ptOpt = (TYPEOPT *)Opt;
    TYPEMOD *ptMod = (TYPEMOD *)Mod;
    double r, divid1, divid2;

    r = log(1. + ptMod->R.Val.V_DOUBLE / 100.);
    divid1 = log(1. + ptMod->Divid1.Val.V_DOUBLE / 100.);
    divid2 = log(1. + ptMod->Divid2.Val.V_DOUBLE / 100.);

    return ExchangeAn(ptMod->S01.Val.V_PDOUBLE, ptMod->S02.Val.V_PDOUBLE, (ptOpt->ratio),
                     ptOpt->Maturity.Val.V_DATE - ptMod->T.Val.V_DATE,
                     r, divid1, divid2,

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        ptMod->Sigma1.Val.V_PDOUBLE, ptMod->Sigma2.Val.V_PDOUBLE, pt
        &(Met->Res[0].Val.V_DOUBLE), &(Met->Res[1].Val.V_DOUBLE), &(
    }

static int CHK_OPT(CF_Exchange)(void *Opt, void *Mod)
{
    return strcmp(((Option *)Opt)->Name, "ExchangeEuro");
}

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

    return OK;
}

PricingMethod MET(CF_Exchange) =
{
    "CF_Exchange",
    {" " , PREMIA_NULLTYPE, {0}, FORBID}},
    CALC(CF_Exchange),
    { {"Price", DOUBLE, {100}, FORBID}, {"Delta1", DOUBLE, {100}, FORBID} , {"Delt
        {" " , PREMIA_NULLTYPE, {0}, FORBID}
    },
    CHK_OPT(CF_Exchange),
    CHK_ok,
    MET(Init)
} ;

```