

## Help

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#include "bs1d_doublim.h"
#define INC 1.0e-5 /*Relative Increment for Delta-Hedging*/

static int Put_KunitomoIkeda_91(double s, NumFunc_1 *L,
    NumFunc_1 *U, NumFunc_1 *Rebate, NumFunc_1 *PayOff, double t,
    double r, double divid, double sigma, double *ptprice, double *ptdelta)
{
    double out_price, out_delta, price_plus, price_minus;

    PutOut_KunitomoIkeda_91(s, L, U, Rebate, PayOff, t, r, divid, sigma,
        &out_price, &out_delta);

    /*Price*/
    *ptprice = out_price;

    PutOut_KunitomoIkeda_91(s*(1.+INC), L, U, Rebate, PayOff, t, r,
        divid, sigma, &out_price, &out_delta);
    price_plus = out_price;

    PutOut_KunitomoIkeda_91(s*(1.-INC), L, U, Rebate, PayOff, t, r,
        divid, sigma, &out_price, &out_delta);
    price_minus = out_price;

    /*Delta*/
    *ptdelta = (price_plus - price_minus) / (2.*s*INC);

    return OK;
}

static int CALC(CF_PutOut_KunitomoIkeda)(void*Opt, void *
    Mod, PricingMethod *Met)
{
    TYPEOPT* ptOpt = (TYPEOPT*)Opt;
    TYPEMOD* ptMod = (TYPEMOD*)Mod;
    double r, divid;

    r = log(1.+ptMod->R.Val.V_DOUBLE/100.);
    divid = log(1.+ptMod->Divid.Val.V_DOUBLE/100.);

    return Put_KunitomoIkeda_91(ptMod->S0.Val.V_PDOUBLE, pt

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    Opt->LowerLimit.Val.V_NUMFUNC_1, ptOpt->UpperLimit.Val.V_
    NUMFUNC_1,
        ptOpt->Rebate.Val.V_NUMFUNC_1,ptOpt->PayO
    ff.Val.V_NUMFUNC_1,ptOpt->Maturity.Val.V_DATE-ptMod->T.Val.
    V_DATE,
        r,divid,ptMod->Sigma.Val.V_PDOUBLE,&(Met->
    Res[0].Val.V_DOUBLE),&(Met->Res[1].Val.V_DOUBLE) );
}

static int CHK_OPT(CF_PutOut_KunitomoIkeda)(void *Opt, voi
    d *Mod)
{Option* ptOpt=(Option*)Opt;
    TYPEOPT* opt=(TYPEOPT*)(ptOpt->TypeOpt);

    if ((opt->Parisian).Val.V_BOOL==WRONG)
        if((opt->RebOrNo).Val.V_BOOL==NOREBATE)
            return strcmp( ((Option*)Opt)->Name,"    DoublePutOutEuro");
    return WRONG;

}

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

    return OK;
}

PricingMethod MET(CF_PutOut_KunitomoIkeda)=
{
    "CF_PutOut_KunitomoIkeda",
    {{ " ",PREMIA_NULLTYPE,{0},FORBID}},
    CALC(CF_PutOut_KunitomoIkeda),
    {{ "Price",DOUBLE,{100},FORBID},{ "Delta",DOUBLE,{100},FORB
        ID} ,{{ " ",PREMIA_NULLTYPE,{0},FORBID}},
    CHK_OPT(CF_PutOut_KunitomoIkeda),
    CHK_ok,
    MET(Init)
}

```

} ;

## References