

Help

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#include <stdlib.h>
#include "rskould_std.h"
#include "math/wienerhopf_rs.h"

#if defined(PremiaCurrentVersion) && PremiaCurrentVersion <
    (2010+2) //The "#else" part of the code will be freely av
    ailable after the (year of creation of this file + 2)
static int CHK_OPT(AP_fastwhamerdig_rskou)(void *Opt, void
    *Mod)
{
    // return NONACTIVE;
}
int CALC(AP_fastwhamerdig_rskou)(void*Opt,void *Mod,Pricing
    Method *Met)
{
    return AVAILABLE_IN_FULL_PREMIA;
}
#else

static char *infilename;

/*////////////////////////////////////////*/
static int wh_rskou_amerdigital(double Spot,
    double T, double h, double Strike1,
    double rebate,
    double er, long int step,int n_state,
    double *ptprice, double *ptdelta)
{

    PnlVect *divi, *rr, *lambda, *pp, *lambdap, *lambdam, *
        cm, *cp, *strike, *sigmas, *rebates, *mu, *qu;
    PnlVect *prices, *deltas;
    double eps;
    PnlMat *lam;
    int res, i, nstates;
    double tomega, omegas, sig2;
    int upordown=1;
    int ifCall=2;

    eps= 1.0e-7; // accuracy of iterations

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res=readparamskou_rs(&nstates, &rr, &divi, &sigmas, &lambdam, &lambdap, &lambda, &pp, &lam, infilename);

if(!res)
{
    printf("An error occured while reading file!\n");
    *ptprice=0.;
    *ptdelta=0.;
    return OK;
}

mu= pnl_vect_create(nstates+1);
qu= pnl_vect_create(nstates+1);
cp= pnl_vect_create(nstates+1);
cm= pnl_vect_create(nstates+1);
strike= pnl_vect_create(nstates+1);
rebates= pnl_vect_create(nstates+1);
prices= pnl_vect_create(nstates+1);
deltas= pnl_vect_create(nstates+1);

for(i=0;i<nstates; i++) LET(strike,i)=Strike1;

if(ifCall==0) {omegas=2.0; }
else {omegas=-1.0;}

for(i=0;i<nstates;i++)
{
    LET(rr,i)=log(1.+GET(rr,i)/100.);
    LET(divi,i)=log(1.+GET(divi,i)/100.);
    LET(rebates,i)= rebate;

    if(ifCall==0)
    {
        tomega = GET(lambdam,i)<-2. ? 2. : (-GET(lambdam,i)+1.)/2.;
        omegas = omegas>tomega ? tomega :omegas;
    }
    else
    {
        tomega=GET(lambdap,i)>1. ? -1. : -GET(lambdap,i)/2

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.;
    omegas = omegas<tomega ? tomega :omegas;
}

LET(cp,i)=(1-GET(pp,i))*GET(lambda,i);
LET(cm,i)=GET(pp,i)*GET(lambda,i);
sig2=GET(sigmas,i)*GET(sigmas,i);

LET(mu,i)= GET(rr,i)- GET(divi,i)+GET(cp,i)/(GET(lam
bdap,i)+1.0)+GET(cm,i)/(GET(lambdam,i)+1.0)-sig2/2.0;

LET(qu,i)=GET(rr,i)-GET(mu,i)*omegas-sig2*omegas*omeg
as/2.0+GET(cp,i)+GET(cm,i)-GET(cp,i)*GET(lambdap,i)/(GET(lam
bdap,i)+omegas)-GET(cm,i)*GET(lambdam,i)/(GET(lambdam,i)+om
egas);
}

res= fastwienerhopf_rs(4, nstates, mu, qu, omegas, 1, up
ordown, ifCall, Spot, lambdam, lambdap,sigmas, sigmas, cm,
cp, rr, divi, lam,
T, h, strike, Strike1, rebates, er, step, eps, prices,
deltas);

//Price
*ptprice =GET(prices,n_state-1);
//Delta
*ptdelta =GET(deltas,n_state-1);

// Memory desallocation
pnl_vect_free(&mu);
pnl_vect_free(&qu);
pnl_vect_free(&prices);
pnl_vect_free(&deltas);
pnl_vect_free(&rr);
pnl_vect_free(&divi);
pnl_vect_free(&sigmas);
pnl_vect_free(&lambdap);
pnl_vect_free(&lambdam);
pnl_vect_free(&cp);
pnl_vect_free(&cm);
pnl_vect_free(&lambda);

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    pnl_vect_free(&pp);
    pnl_vect_free(&strike);
    pnl_vect_free(&rebates);

    pnl_mat_free(&lam);

    return OK;
}

//=====
=====
int CALC(AP_fastwhamerdig_rskou)(void *Opt,void *Mod,PricingMethod *Met)
{
    TYPEOPT* ptOpt=( TYPEOPT*)Opt;
    TYPEMOD* ptMod=( TYPEMOD*)Mod;
    double strike, spot,rebate;

    NumFunc_1 *p;
    int res;

    p=ptOpt->PayOff.Val.V_NUMFUNC_1;
    strike=p->Par[0].Val.V_DOUBLE;
    spot=ptMod->S0.Val.V_DOUBLE;

    rebate=p->Par[1].Val.V_DOUBLE;

    infilename= ptMod->Transition_probabilities.Val.V_FILENAME;

    res = wh_rskou_amerdigital(spot,
        ptOpt->Maturity.Val.V_DATE-ptMod->T.Val.V_DATE,
        Met->Par[1].Val.V_DOUBLE, strike,rebate,
        Met->Par[0].Val.V_DOUBLE, Met->Par[2].Val.V_INT2
        ,Met->Par[3].Val.V_INT,
        &(Met->Res[0].Val.V_DOUBLE), &(
        Met->Res[1].Val.V_DOUBLE));

    return res;
}

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static int CHK_OPT(AP_fastwhamerdig_rskou)(void *Opt, void
    *Mod)
{

    //return NONACTIVE;
    if ((strcmp( ((Option*)Opt)->Name,"DigitAmer")==0))
        return OK;

    return WRONG;
}

#endif //PremiaCurrentVersion
static int MET(Init)(PricingMethod *Met,Option *Opt)
{
    static int first=1;

    if (first)
    {
        Met->Par[0].Val.V_PDOUBLE=2.0;
        Met->Par[1].Val.V_PDOUBLE=0.01;
        Met->Par[2].Val.V_INT2=10;
        Met->Par[3].Val.V_INT=1;
        first=0;
    }

    return OK;
}

PricingMethod MET(AP_fastwhamerdig_rskou)=
{
    "AP_FastWHDig_RSKOU",
    { {"Scale of logprice range", DOUBLE, {100}, ALLOW},
      {"Space Discretization Step",DOUBLE,{500},ALLOW},
      {"TimeStepNumber",INT2,{100},ALLOW},
      {"Output state number",INT,{100},ALLOW},
      {" ",PREMIA_NULLTYPE,{0},FORBID}},
    CALC(AP_fastwhamerdig_rskou),
    {{"Price of chosen state",DOUBLE,{100},FORBID},
      {"Delta of chosen state",DOUBLE,{100},FORBID},

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    {" ",PREMIA_NULLTYPE,{0},FORBID}},  
    CHK_OPT(AP\_fastwamerdig_rskou),  
    CHK_split,  
    MET(Init)  
};
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References