

Help

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#include <stdlib.h>
#include "kou1d_pad.h"
#include "math/ap_fusai_levy/QDiscreteAsian.h"
#include "math/ap_fusai_levy/nrutil.h"

#if defined(PremiaCurrentVersion) && PremiaCurrentVersion <
    (2008+2) //The "#else" part of the code will be freely available after the (year of creation of this file + 2)
static int CHK_OPT(AP_FixedAsian_FusaiMeucciKOU)(void *Opt,
    void *Mod)
{
    return NONACTIVE;
}
int CALC(AP_FixedAsian_FusaiMeucciKOU)(void *Opt,void *Mod,
    PricingMethod *Met)
{
    return AVAILABLE_IN_FULL_PREMIA;
}
#else
static int FusaiMeucciKOU_FixedAsian(double pseudo_stock,
    double pseudo_strike,NumFunc_2 *po,double t,double r,double divid,
    double sigma,double lambda,double lambdap,double lambdam,
    double p,int N,int M,double *ptprice,double *ptdelta)
{
    double CTtK,PTtK,Dlt,Plt;
    double lowlim=10.,uplim=10.;
    long int nfft=65536;
    double *price,*solution,delta;

    price=dvector(0,M-1);
    solution=dvector(0,M-1);

    /* Call Price */
    CTtK= Asian_DE_FusaiMeucci(pseudo_stock,pseudo_strike,t,
        r,divid,sigma,lambda,p,lambdap,lambdam,N,lowlim,uplim,M,nfft,price,solution,&delta);

    /* Put Price from Parity*/
    if(r==divid)
        PTtK=CTtK+pseudo_strike*exp(-r*t)-pseudo_stock*exp(-r*

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        t);
    else
        PTtK=CTtK+pseudo_strike*exp(-r*t)-pseudo_stock*exp(-r*
            t)*(exp((r-divid)*t)-1.)/(t*(r-divid));

    /*Delta for call option*/
    Dlt=delta;

    /*Delta for put option*/
    if(r==divid)
        Plt=Dlt-exp(-r*t);
    else
        Plt=Dlt-exp(-r*t)*(exp((r-divid)*t)-1.0)/(t*(r-divid));

    /*Price*/
    if ((po->Compute)==&Call_OverSpot2)
        *ptprice=CTtK;
    else
        *ptprice=PTtK;

    /*Delta */
    if ((po->Compute)==&Call_OverSpot2)
        *ptdelta=Dlt;
    else
        *ptdelta=Plt;

    free_dvector(price,0,M-1);
    free_dvector(solution,0,M-1);

    return OK;
}

int CALC(AP\_FixedAsian\_FusaiMeucciKOU)(void *Opt,void *Mod,
    PricingMethod *Met)
{
    TYPEOPT* ptOpt=(TYPEOPT*)Opt;
    TYPEMOD* ptMod=(TYPEMOD*)Mod;

    int return_value;
    double r,divid,time_spent,pseudo_spot,pseudo_strike;
    double t_0, T_0;

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

T_0 = ptMod->T.Val.V_DATE;
t_0= (ptOpt->PathDep.Val.V_NUMFUNC_2)->Par[0].Val.V_PDOUB
    LE;

if(T_0 < t_0)
{
    Fprintf(TOSCREEN,"T_0 < t_0, untreated case{n{n{n"});
    return_value = WRONG;
}
/* Case t_0 <= T_0 */
else
{
    time_spent=(ptMod->T.Val.V_DATE-(ptOpt->PathDep.Val.
V_NUMFUNC_2)->Par[0].Val.V_PDOUBLE)/(ptOpt->Maturity.Val.V_
DATE-(ptOpt->PathDep.Val.V_NUMFUNC_2)->Par[0].Val.V_PDOUB
LE);
    pseudo_spot=(1.-time_spent)*ptMod->S0.Val.V_PDOUBLE;
    pseudo_strike=(ptOpt->PayOff.Val.V_NUMFUNC_2)->Par[0]
.Val.V_PDOUBLE-time_spent*(ptOpt->PathDep.Val.V_NUMFUNC_2)
->Par[4].Val.V_PDOUBLE;

return_value= FusaiMeucciKOU_FixedAsian(pseudo_spot,pseu
do_strike,ptOpt->PayOff.Val.V_NUMFUNC_2,ptOpt->Maturity.Val.
V_DATE-ptMod->T.Val.V_DATE,r,divid,ptMod->Sigma.Val.V_PDOUB
LE,ptMod->Lambda.Val.V_PDOUBLE,ptMod->LambdaPlus.Val.V_PDOUB
LE,ptMod->LambdaMinus.Val.V_PDOUBLE,ptMod->P.Val.V_PDOUBLE,
Met->Par[0].Val.V_INT2,Met->Par[1].Val.V_INT2,&(Met->Res[0].
Val.V_DOUBLE),&(Met->Res[1].Val.V_DOUBLE));
}

return return_value;
}

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

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    if ( (strcmp(((Option*)Opt)->Name,"AsianCallFixedEuro")==
        0) || (strcmp( ((Option*)Opt)->Name,"AsianPutFixedEuro")==
        0) )
        return OK;
    return WRONG;
}

#endif //PremiaCurrentVersion
static int MET(Init)(PricingMethod *Met,Option *Opt)
{
    if ( Met->init == 0)
    {
        Met->init=1;
        Met->Par[0].Val.V_INT2=52;
        Met->Par[1].Val.V_INT2=5000;
    }
    return OK;
}

PricingMethod MET(AP_FixedAsian_FusaiMeucciKOU)=
{
    "AP_FixedAsian_FusaiMeucci_Kou",
    {{ "Nb.of Monitoring Dates",INT2,{2000},ALLOW },
      {"Nb.of Integration Points ",INT2,{1000},ALLOW},
      {" ",PREMIA_NULLTYPE,{0},FORBID}},
    CALC(AP_FixedAsian_FusaiMeucciKOU),
    {{ "Price",DOUBLE,{100},FORBID},{ "Delta",DOUBLE,{100},FORB
      ID} ,{" ",PREMIA_NULLTYPE,{0},FORBID}},
    CHK_OPT(AP_FixedAsian_FusaiMeucciKOU),
    CHK_ok,
    MET(Init)
};

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References