```
   Help
#include <stdlib.h>
#include  "mer1d_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 av
    ailable after the (year of creation of this file + 2)
static int CHK_OPT(AP_FixedAsian_FusaiMeucciMER)(void *Opt,
     void *Mod)
{
  return NONACTIVE;
}
int CALC(AP_FixedAsian_FusaiMeucciMER)(void *Opt,void *Mod,
    PricingMethod *Met)
{
return AVAILABLE_IN_FULL_PREMIA;
}
#else
static int FusaiMeucciMER_FixedAsian(double pseudo_stock,
    double pseudo_strike,NumFunc_2  *po,double t,double r,double div
    id,double sigma,double lambda,double mu,double gamma2,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;
  double stddev=sqrt(gamma2);

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

  /*  Call Price */
  CTtK=Asian_MERTON_FusaiMeucci(pseudo_stock,pseudo_strike,
    t,r,divid,sigma,mu,lambda,stddev,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*
    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_FusaiMeucciMER)(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;

  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= FusaiMeucciMER_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->Mean.Val.V_PDOUBLE,pt
    Mod->Variance.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_FusaiMeucciMER)(void *Opt,
     void *Mod)
```

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

References