Help

```
#include <stdlib.h>
#include  "bs1d_std.h"
#include "error_msg.h"

static int LnThirdMoment(int am,double s,NumFunc_1 *p,
    double t,double r,double divid,double sigma,int N,double *pt
    price,double *ptdelta)
{
  double  h,mu,u,d,scan,proba,lowerstock,iv,stock;
  double  *P;
  int     i,j,npoints=2*N+1;

  /*Price array*/
  P= malloc(npoints*sizeof(double));
  if (P==NULL)
    return MEMORY_ALLOCATION_FAILURE;

  /*Up and Down factors*/
  h=t/(double)N;
  mu=(r-divid)-.5*sigma*sigma;
  u=exp(sigma*sqrt(3.*h));
  d=1./u;
  scan=u;
  u*=exp(mu*h);
  d*=exp(mu*h);

  /*Discounted Probability*/
  proba=exp(-r*h)/6.;

  /*Terminal values*/
  lowerstock=s;
  for (i=0;i<N;i++)
    lowerstock*=d;

  stock=lowerstock;
  for (i=0;i<npoints;i++)
    {
      iv=(p->Compute)(p->Par,stock);
      P[i]=iv;
      stock*=scan;
```

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  }


/*Backward Resolution*/
for (i=N;i>1;i--)
  {
    npoints-=2;
    lowerstock/=d;
    stock=lowerstock;
    for (j=0;j<npoints;j++)
{
  P[j]=proba*(P[j]+4.*P[j+1]+P[j+2]);
  if (am)
    {
      iv=(p->Compute)(p->Par,stock);
      P[j]=MAX(iv,P[j]);
    }
  stock*=scan;
}

  }
lowerstock/=d;
stock=lowerstock;

/*Delta*/
*ptdelta=(P[2]-P[0])/(stock*u-stock*d);


/*First time step*/
P[0]=proba*(P[0]+4.*P[1]+P[2]);
if (am)
  {
    iv=(p->Compute)(p->Par,stock);
    P[0]=MAX(iv,P[0]);
  }

/*Price*/
*ptprice=P[0];

/*Memory desallocation*/
free(P);
```

```
  return OK;
}

int CALC(TR_LnThirdMoment)(void *Opt,void *Mod,Pricing
    Method *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  LnThirdMoment(ptOpt->EuOrAm.Val.V_BOOL,ptMod->S0.
    Val.V_PDOUBLE,
      ptOpt->PayOff.Val.V_NUMFUNC_1,ptOpt->Maturity.Val.
    V_DATE-ptMod->T.Val.V_DATE,
      r,divid,ptMod->Sigma.Val.V_PDOUBLE,Met->Par[0].Val
    .V_INT,&(Met->Res[0].Val.V_DOUBLE),&(Met->Res[1].Val.V_
    DOUBLE));
}

static int CHK_OPT(TR_LnThirdMoment)(void *Opt, void *Mod)
{
  return  OK;
}

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

      Met->Par[0].Val.V_INT2=100;


    }

  return OK;
}
```

```
PricingMethod MET(TR_LnThirdMoment)=
{
  "TR_LnThirdMoment",
  {{"StepNumber",INT2,{100},ALLOW},{" ",PREMIA_NULLTYPE,{0}
    ,FORBID}},
  CALC(TR_LnThirdMoment),
  {{"Price",DOUBLE,{100},FORBID},{"Delta",DOUBLE,{100},FORB
    ID} ,{" ",PREMIA_NULLTYPE,{0},FORBID}},
  CHK_OPT(TR_LnThirdMoment),
  CHK_tree,
  MET(Init)
};
```

References