

[Help](#)

```

#define WITH_formula 1
#include "bs1d_lim.h"

static int PutDownOut_ReinerRubinstein(double s,double k,
    double l,double rebate,double t,double r,double divid,double si
    gma,double *ptprice,double *ptdelta)
{
    int phi,eta;
    double A,B,C,D,E,F;
    double dA,dB,dC,dD,dE,dF;

    phi=-1;
    eta=1;
    formula(s,k,r,divid,sigma,t,l,rebate,phi,eta,&A,&B,&C,&D,
        &E,&F,
        &dA,&dB,&dC,&dD,&dE,&dF);
    if (k>=1)
    {
        *ptprice=A-B+C-D+F;
        *ptdelta=dA-dB+dC-dD+dF;
    }
    else
    {
        *ptprice=F;
        *ptdelta=dF;
    }
    return OK;
}

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

    r=log(1.+ptMod->R.Val.V_DOUBLE/100.);
    divid=log(1.+ptMod->Divid.Val.V_DOUBLE/100.);
    limit=((ptOpt->Limit.Val.V_NUMFUNC_1)->Compute)((ptOpt->Limit.Val.V_NUMFUN
    rebate=((ptOpt->Rebate.Val.V_NUMFUNC_1)->Compute)((ptOpt->

```

```

    >Rebate.Val.V_NUMFUNC_1)->Par,ptMod->T.Val.V_DATE);

return PutDownOut_ReinerRubinstein(ptMod->S0.Val.V_PDOUB
    LE,(ptOpt->PayOff.Val.V_NUMFUNC_1)->Par[0].Val.V_PDOUBLE,
        limit,rebate,ptOpt->Maturity.Val.V_DATE-pt
    Mod->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_PutDownOut)(void *Opt, void *Mod)
{ Option* ptOpt=(Option*)Opt;
  TYPEOPT* opt=(TYPEOPT*)(ptOpt->TypeOpt);

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

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

  return OK;
}

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

```

References