

## [Help](#)

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#include <stdlib.h>
#include "
href../../mod/kou1d/kou1d_std/kou1d_std_h_src.pdfkou1d_std.h"
#include "
href../../common/math/wienerhopf_h_src.pdfmath/wienerhopf.h"

#if defined(PremiaCurrentVersion) && PremiaCurrentVersion < (2009+2) //The "#els
static int CHK_OPT(AP_fastwhamerdig_kou)(void *Opt, void *Mod)
{
    return NONACTIVE;
}
int CALC(AP_fastwhamerdig_kou)(void *Opt, void *Mod, PricingMethod *Met)
{
    return AVAILABLE_IN_FULL_PREMIA;
}
#else

/*////////////////////////////////////*/
static int wh_kou_amerdigital(double Spot, double sigma, double lambda, double l
                                double r, double divid,
                                double T, double h, double Strike1,
                                double rebate,
                                double er, long int step,
                                double *ptprice, double *ptdelta)
{
    int upordown = 1;
    double cp, cm, ptprice1, ptdelta1, mu, qu, omega, sig2, lp, lm;

    lp = lambdam;
    lm = -lambdap;

    if (upordown == 0)
    {
        omega = lm < -2. ? 2. : (-lm + 1.) / 2.;
    }
    else
    {
        omega = lp > 1. ? -1. : -lp / 2.;
    }
}
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    }

    cp = (1 - P) * lambda;
    cm = P * lambda;

    sig2 = sigma * sigma;

    mu = r - divid + cp / (lp + 1.0) + cm / (lm + 1.0) - sig2 / 2.0;

    qu = r - mu * omega - sig2 * omega * omega / 2 + cp + cm - cp * lp / (lp + 1.0) - cm * lm / (lm + 1.0);

    fastwienerhopf(4, mu, qu, omega, 0, upordown, 2, Spot, lm, lp,
                    2.0, sigma, cm, cp, r, divid,
                    T, h, Strike1, Strike1, rebate,
                    er, step, &ptprice1, &ptdelta1);

    //Price
    *ptprice = ptprice1;
    //Delta
    *ptdelta = ptdelta1;

    return OK;
}

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

    NumFunc_1 *p;
    int res;

    r = log(1. + ptMod->R.Val.V_DOUBLE / 100.);
    divid = log(1. + ptMod->Divid.Val.V_DOUBLE / 100.);
    p = ptOpt->PayOff.Val.V_NUMFUNC_1;
    strike = p->Par[0].Val.V_DOUBLE;
    spot = ptMod->S0.Val.V_DOUBLE;

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

res = wh_kou_amerdigital(spot, ptMod->Sigma.Val.V_PDOUBLE, ptMod->Lambda.Val.V_
    r, divid,
    ptOpt->Maturity.Val.V_DATE - ptMod->T.Val.V_DATE, Met
    Met->Par[0].Val.V_DOUBLE, Met->Par[2].Val.V_INT2,
    &(Met->Res[0].Val.V_DOUBLE), &(Met->Res[1].Val.V_DOUB

return res;

}

static int CHK_OPT(AP_fastwhamerdig_kou)(void *Opt, void *Mod)
{
    // Option* ptOpt=(Option*)Opt;
    // TYPEOPT* opt=(TYPEOPT*)(ptOpt->TypeOpt);

    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 = 600;

        first = 0;
    }

    return OK;
}

```

```

PricingMethod MET(AP_fastwhamerdig_kou) =
{
    "AP_FastWHDig_Kou",
    { {"Scale of logprice range", DOUBLE, {100}, ALLOW},
      {"Space Discretization Step", DOUBLE, {500}, ALLOW},
      {"TimeStepNumber", INT2, {100}, ALLOW},
      {" ", PREMIA_NULLTYPE, {0}, FORBID}
    },
    CALC(AP_fastwhamerdig_kou),
    { {"Price", DOUBLE, {100}, FORBID},
      {"Delta", DOUBLE, {100}, FORBID},
      {" ", PREMIA_NULLTYPE, {0}, FORBID}
    },
    CHK_OPT(AP_fastwhamerdig_kou),
    CHK_split,
    MET(Init)
};

```