Help

```
#if defined(PremiaCurrentVersion) && PremiaCurrentVersion <
     (2011+2) //The "#else" part of the code will be freely av
    ailable after the (year of creation of this file + 2)
#else

#include "pnl/pnl_complex.h"
#include "libor_affine_framework.h"
#include "libor_affine_models.h"


///****************** CIR 1d Model*****************///

void phi_psi_cir1d(PnlVect *ModelParams, double t, dcompl
    ex u, dcomplex *phi_i, dcomplex *psi_i)
{
    double lambda, theta, eta, SQR_eta;
    dcomplex z1, z2;
    double b_t, a_t;

    //x0     = GET(ModelParams, 0);
    lambda = GET(ModelParams, 1);
    theta  = GET(ModelParams, 2);
    eta    = GET(ModelParams, 3);
    SQR_eta = SQR(eta);

    a_t = exp(-lambda*t);

    if (lambda == 0.) b_t = t;
    else b_t = (1.-a_t)/lambda;

    z1 = RCsub(1., RCmul(2*SQR_eta*b_t, u));
    *phi_i = RCmul(-lambda*theta/(2*SQR_eta), Clog(z1));

    z1 = RCmul(a_t, u);
    z2 = RCsub(1., RCmul(2*SQR_eta*b_t, u));
    *psi_i = Cdiv(z1, z2);
}

double MaxMgfArg_cir1d(PnlVect *ModelParams, double T)
{
    double lambda,eta;
    double b_t;

    //x0     = GET(ModelParams, 0);
    lambda = GET(ModelParams, 1);
    //theta  = GET(ModelParams, 2);
    eta    = GET(ModelParams, 3);

    if (lambda == 0.) b_t = T;
    else b_t = (1.-exp(-lambda*T))/lambda;

    return 1./(2*SQR(eta)*b_t);
}

///******************* Gamma-OU 1d Model*******************
    ///
void phi_psi_gou1d(PnlVect *ModelParams, double t, dcompl
    ex u, dcomplex *phi_i, dcomplex *psi_i)
{
    double lambda, alpha, beta;
    double a_t;
    dcomplex z0, z1, z2, z3;

    lambda = GET(ModelParams, 1);
    alpha  = GET(ModelParams, 2);
    beta    = GET(ModelParams, 3);

    a_t = exp(-lambda*t);

    z0 = RCmul(a_t, u);
    z1 = RCsub(alpha, z0);
    z2 = RCsub(alpha, u);
    z3 = RCmul(beta, Clog(Cdiv(z1, z2)));

    *phi_i = z3;
    *psi_i = z0;
}

double MaxMgfArg_gou1d(PnlVect *ModelParams, double T)
{
    // The maximum is alpha=GET(ModelParams, 2)
    return GET(ModelParams, 2);
}

#endif
```

References