Help

```
#include <stdio.h>
#include <stdlib.h>
#include <math.h>

#include "pnl/pnl_cdf.h"
#include "cdo_math.h"
#include "pnl/pnl_specfun.h"


double nig_generic_density(double x, double alpha, double
    beta, double gamma, double mu, double delta)
{
  double      f_x = sqrt(delta * delta + (x-mu) * (x-mu));
  return ( (delta * alpha * exp(delta * gamma + beta * (x-
    mu)) *
           pnl_bessel_k(1., alpha * f_x)) / (M_PI * f_x) )
    ;
}

double ig_generic_density(double y, double alpha, double
    beta)
{
  double      z = alpha - beta * y;

  if (y <= 0) return ( 0. );
  return ( M_1_SQRT2PI * (alpha / sqrt(beta)) * pow(y, -1.5
    ) * exp(- z*z / (2. * beta * y)) );
}

double  nig_generic_cdf(double x, double  alpha, double bet
    a, double  gamma, double mu, double delta)
{
  double      y;
  double      z;
  double      t;
  double      h;
  double      s1;
  double      s2;

  s1 = 0;
```

```
  h = 4./100.;
  for (y = MINDOUBLE; y < 4.; y += h) {
    z = ( x - (mu + beta*(y+0.5*h)) ) / sqrt(y+0.5*h);
    s1 += cdf_nor(z) * ig_generic_density(y+0.5*h, delta *
    gamma, gamma * gamma);
  }
  s1 *= h;
  s2 = 0;
  h = exp(-4.)/20.;
  for (t = MINDOUBLE; t < exp(-4.); t += h) {
    y = -log(t+0.5*h);
    z = ( x - (mu + beta*y) )/ sqrt(y);
    s2 += cdf_nor(z) * ig_generic_density(y, delta * gamma,
     gamma * gamma) * (1./(t+0.5*h));
  }
  s2 *= h;

  return (s1 + s2);
};
```

References