## Computation program for the coupling matrix of $G_0$

```
#include "stdafx.h"
#include "stdio.h"
#include "math.h"
#define GAMMA (0.0084)
#define ALPHA (1.56)
#define KEXI (19.5)
#define BETA (0.13)
#define PI (3.1415926)
//320
#define MATRIX_X (1)
//64
#define MATRIX_Y (9)
double cal_c_data(double matrix_i)
{
    return 2.5 + 5*(matrix_i - 1);
}
double cal_matrix(int matrix_x, int matrix_i)
{
    double x;
    double x1;
    double x2;
    double x3;
    double x4;
    double x5;
    double x6;
    double y;
    x = matrix_x - cal_c_data(matrix_i);
    x1 = GAMMA*1.0/2;
    x2 = exp(ALPHA*pow((x + BETA * KEXI), 2)/pow(KEXI,2));
    x3 = cos(PI*(x + BETA * KEXI)/KEXI);
    x4 = exp(ALPHA*pow((x - BETA * KEXI),2)/pow(KEXI,2));
    x5 = cos(PI*(x - BETA * KEXI)/KEXI);
    y = x1*(x2*x3 + x4*x5);
    printf("matrix_x=%d,matrix_i=%d,x=%lf,x1=%lf,x2=%lf,x3=%lf,x4=%lf,x5=%l
f,y=%lf\r\n",matrix_x,matrix_i,x,x1,x2,x3,x4,x5,y);
    return y;
}
int main(int argc, char* argv[])
{
    int iloop;
    int jloop;
```

```
    double result[MATRIX_X][MATRIX_Y];
    FILE *fp1;
    fp1=fopen("result.txt","w");
    for (iloop = 0; iloop < MATRIX_X; iloop++)
    {
        for (jloop = 0; jloop < MATRIX_Y; jloop++)
        {
            result[iloop][jloop] = cal_matrix(iloop + 1, jloop + 1);
            if (result[iloop][jloop] < 0.0001)
            {
                result[iloop][jloop] = 0;
            }
            else if (result[iloop][jloop] > 9999)
            {
                result[iloop][jloop] = 9999;
            }
            fprintf(fp1, "%lf ", result[iloop][jloop]);
        }
        fprintf(fp1, "\r");
    }
    return 0;
}
```