```cpp
// 11_1.cpp

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

#define N_MAX 1000000   //繰り返し回数の上限値を設定
#define DT 0.0001       //数値積分刻み
#define T_END 5.0       //シミュレーション終了時間 [s]

#define LENGTH 0.5      //振り子長さ [m]
#define THETA_0 0.57    //初期角度   [rad]
#define OMEGA_0 0.0     //初期角速度 [rad/s]
#define GRAVITY 9.80665 //重力加速度 [m/s^2]

double f1(double y1, double y2, double t)
{
    return y2;
}

double f2(double y1, double y2, double t)
{
    return -GRAVITY/LENGTH * sin(y1);
}
//初期表示画面
void init_scrn(void)
{
    printf("Time [s]\tTheta [rad]\tOmega [rad/s]\n");
}

void RK4(void)
{
    int i = 0;
    double theta = THETA_0, omega = OMEGA_0, t = 0.0;
    double k_theta[4], k_omega[4];

        while(t < T_END && i < N_MAX){

        t = DT*(double)i;

        if(i%100==0)
        printf("%5.3f\t%6.4f\t%6.4f\n",t,theta,omega);

        //1
        k_theta[0] = f1(theta, omega, t);
        k_omega[0] = f2(theta, omega, t);

        //2
        k_theta[1] = f1(theta+k_theta[0]*DT/2.0, omega+k_omega[0]*DT/2.0, t+DT/2.0);
        k_omega[1] = f2(theta+k_theta[0]*DT/2.0, omega+k_omega[0]*DT/2.0, t+DT/2.0);

        //3
        k_theta[2] = f1(theta+k_theta[1]*DT/2.0, omega+k_omega[1]*DT/2.0, t+DT/2.0);
        k_omega[2] = f2(theta+k_theta[1]*DT/2.0, omega+k_omega[1]*DT/2.0, t+DT/2.0);

        //4
        k_theta[3] = f1(theta+k_theta[2]*DT, omega+k_omega[2]*DT, t+DT);
        k_omega[3] = f2(theta+k_theta[2]*DT, omega+k_omega[2]*DT, t+DT);

        theta += (k_theta[0]+2.0*k_theta[1]+2.0*k_theta[2]+k_theta[3])*DT/6.0;
        omega += (k_omega[0]+2.0*k_omega[1]+2.0*k_omega[2]+k_omega[3])*DT/6.0;

        i++;
    }
}


int main(void)
{
    init_scrn();
    RK4();
    return 0;
}
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