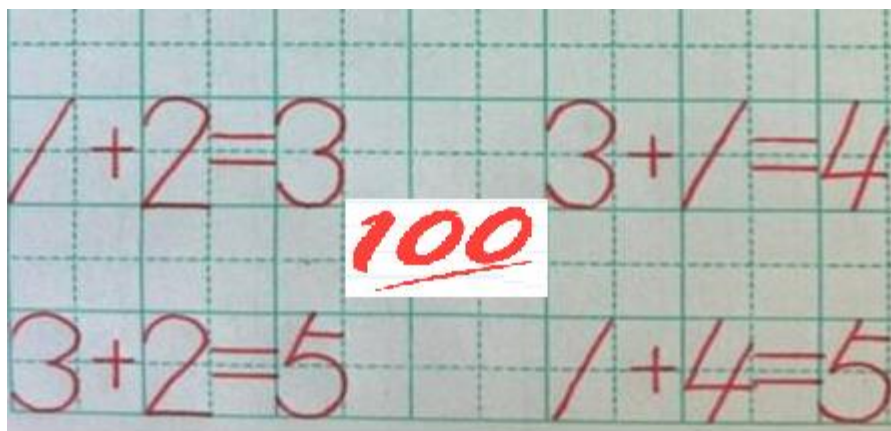


2018春季 计算物理 习题 (共3批)



李强 北京大学物理学院中楼411

qliphy0@pku.edu.cn, 15210033542

<http://www.phy.pku.edu.cn/personnel/member/LiQ.xml>

- 1 ODE 见课件最后一页

<http://www.phy.pku.edu.cn/~qiangli/CP2017-Part2-2.pdf>

- 2 PDE 见课件最后一页

<http://www.phy.pku.edu.cn/~qiangli/CP2017-Part2-3.pdf>

- 3 随机行走 参加课件及本文件后几页

$L=1-R$, R 为任意取的(0-1)之间的小数, 给出模拟结果并解释

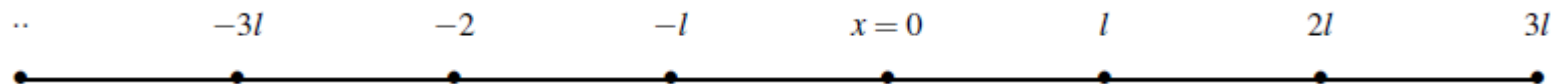
$L! = 0.0/0.5/1.0$ 有两位非零的有效数字

<http://www.phy.pku.edu.cn/~qiangli/CP2017-Part2-6.pdf>

考试时间: 周二(2018.06.26)下午2-4pm
地点理教103

冯老师答疑: 6月17日下午2-3点 冯老师办公室,或邮件预约
李老师答疑: 邮件预约

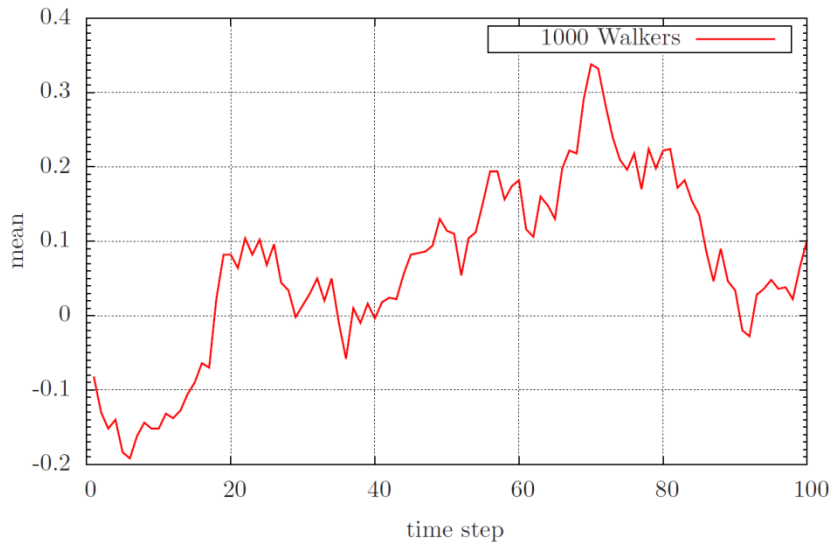
随机行走



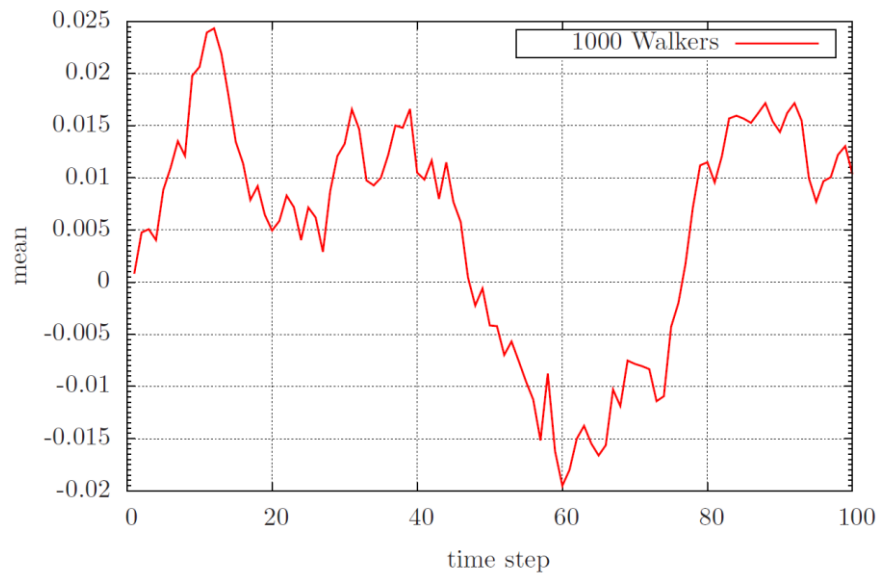
Consider now a random walker in one dimension, with probability R of moving to the right and L for moving to the left. At $t = 0$ we place the walker at $x = 0$, as indicated in Fig. 12.2. The walker can then jump, with the above probabilities, either to the left or to the right for each time step. Note that in principle we could also have the possibility that the walker remains in the same position. This is not implemented in this example. Every step has length $\Delta x = l$. Time is discretized and we have a jump either to the left or to the right at every time step. Let us now assume that we have equal probabilities for jumping to the left or to the right, i.e., $L = R = 1/2$. The average displacement after n time steps is

$$\langle x(n) \rangle = \sum_i^n \Delta x_i = 0 \quad \Delta x_i = \pm l,$$

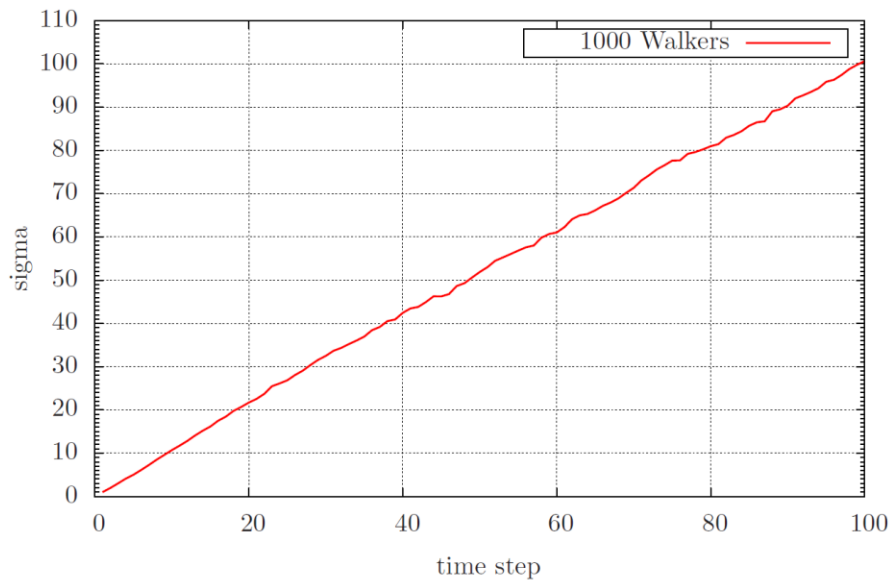
A Random Walker example



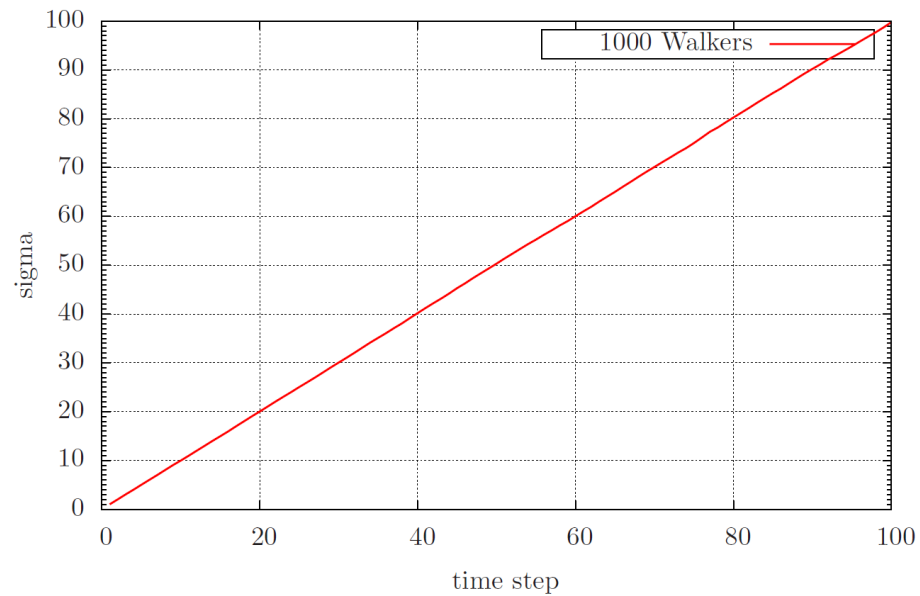
A Random Walker example



A Random Walker example

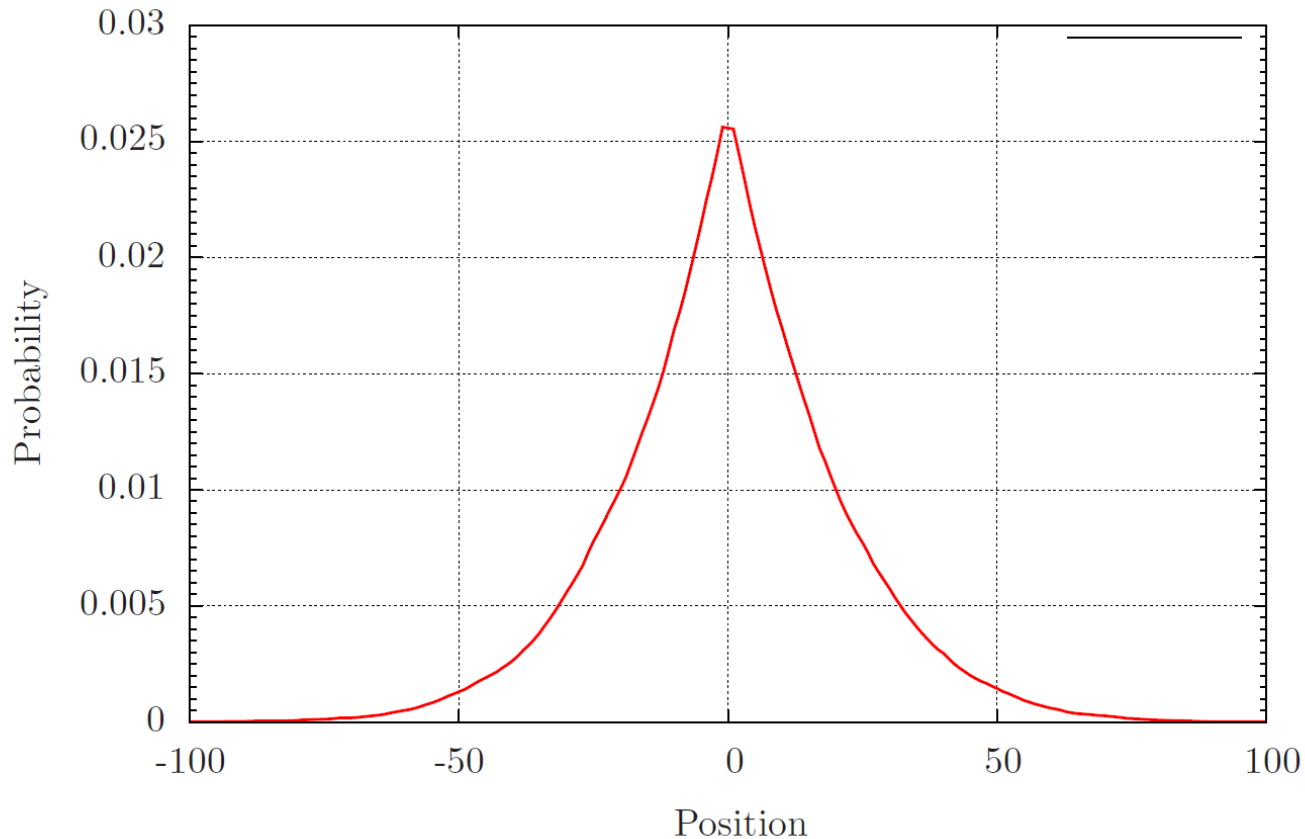


A Random Walker example



```
for( int i = -number_walks; i <= number_walks; i++){  
  double histogram = probability[i+number_walks]/norm;  
  probfile << setiosflags(ios::showpoint | ios::uppercase);  
  probfile << setw(6) << i;  
  probfile << setw(15) << setprecision(8) << histogram << endl; }
```

A Random Walker example



Walker: 10K
TimeStep: 900