

---

## Diffusion in Three Dimensions — Monte Carlo

This is our twenty-second notebook. It is straightforward now that you have seen one- and two-dimensional diffusion solved with `NDSolve[]` to take the same approach in three dimensions.

So we are going to do something completely different: Monte Carlo. In a way, this takes us all the way back to the very first demonstration I did, which was called “Heads or Tails.” What better way to simulate random processes, than to let the computer make random steps?

### A Swarm

We need a list that holds a swarm of particles. The particle properties could get fancy. They could have mass, temperature, and composition. I am just going to deal with swarms of points that have no properties. They only have a position.

```
In[20]:= addToSwarm[s_] := Append[s, {0.0}]  
NestList[addToSwarm, {}, 3]
```

```
Out[21]= {{}, {{0.}}, {{0.}, {0.}}, {{0.}, {0.}, {0.}}}
```