

```

In[1]:= step = 0.2;

In[2]:= coordinates = Select[Flatten[Table[{x, y, z}, {x, -0.99, 0.99, step},
      {y, -0.99, 0.99, step}, {z, -0.99, 0.99, step}], 2], #.# ≤ 1 &];

In[3]:= L = Length[coordinates]
Out[3]= 500

In[4]:= {time1, A} =
  AbsoluteTiming[Flatten[Table[NonNegative[2 * (4 * Norm[coordinates[[i]] - coordinates[[k]] -
      2 * (1 - Sqrt[1 - Norm[coordinates[[i]] ^ 2]) -
      2 * (1 - Sqrt[1 - Norm[coordinates[[k]] ^ 2])]) ^ (1 / 2) *
      (4 * Norm[coordinates[[k]] - coordinates[[j]] - 2 * (1 - Sqrt[1 - Norm[coordinates[[k]] ^
      2]) - 2 * (1 - Sqrt[1 - Norm[coordinates[[j]] ^ 2])]) ^ (1 / 2) -
      (6 - 2 coordinates[[i]].coordinates[[j]] -
      4 Norm[coordinates[[i]] - coordinates[[k]] - 4 Norm[coordinates[[k]] - coordinates[[j]] +
      4 * (1 - Sqrt[1 - Norm[coordinates[[k]] ^ 2])])], {i, 1, Length[coordinates]}],
      {j, 1, Length[coordinates]}], {k, 1, Length[coordinates]}], 2]];

In[5]:= r1 = Count[A, True] / Length[A];

In[6]:= N[r1]
Out[6]= 0.858894

In[7]:= time1 / 60
Out[7]= 120.421

In[8]:= Length[A]
Out[8]= 125 000 000

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In[9]:= pts1 = RandomPoint[Ball[], L];

In[10]:= pts2 = RandomPoint[Ball[], L];

In[11]:= pts3 = RandomPoint[Ball[], L];

In[12]:= {time2, B} =
  AbsoluteTiming[
    Flatten[
      Table[
        NonNegative[
          2 * (4 * Norm[pts1[[i]] - pts3[[k]] - 2 * (1 - Sqrt[1 - Norm[pts1[[i]] ^ 2]) -
            2 * (1 - Sqrt[1 - Norm[pts3[[k]] ^ 2])]) ^ (1 / 2) *
            (4 * Norm[pts3[[k]] - pts2[[j]] - 2 * (1 - Sqrt[1 - Norm[pts3[[k]] ^ 2]) -
            2 * (1 - Sqrt[1 - Norm[pts2[[j]] ^ 2])]) ^ (1 / 2) -
            (6 - 2 pts1[[i]].pts2[[j]] - 4 Norm[pts1[[i]] - pts3[[k]] - 4 Norm[pts3[[k]] - pts2[[j]] +
            4 * (1 - Sqrt[1 - Norm[pts3[[k]] ^ 2])])], {i, 1, L}, {j, 1, L}, {k, 1, L}], 2]];

In[13]:= r2 = Count[B, True] / Length[B];

```

```
In[14]:= N[r2]
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```
Out[14]=  
0.848678
```

```
In[15]:= time2 / 60
```

```
Out[15]=  
113.492
```

```
In[16]:= Length[B]
```

```
Out[16]=  
125 000 000
```

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```
In[17]:= N[r1 - r2]
```

```
Out[17]=  
0.0102156
```

```
In[18]:= N[r1]
```

```
Out[18]=  
0.858894
```

```
In[19]:= N[r2]
```

```
Out[19]=  
0.848678
```