Simulating the Distribution of Correlation, Geometric Approach

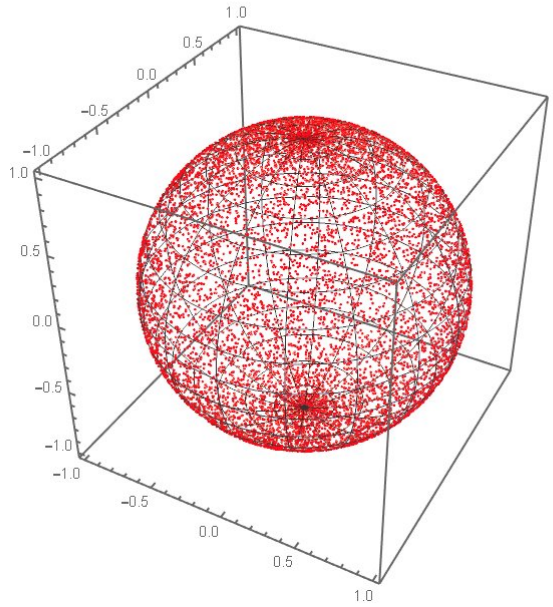
We simulate on a unit sphere by Monte Carlo, in higher dimensions, n - sphere or ball

In[128]:=
```
τ = Join[{r}, Table[θi, {i, 1, 6}], {φ}] // Flatten;
τ1 = FromPolarCoordinates[τ // Flatten]; TableForm[τ1]
```

In[129]:=
```
r Cos[θ1]
r Cos[θ2] Sin[θ1]
r Cos[θ3] Sin[θ1] Sin[θ2]
r Cos[θ4] Sin[θ1] Sin[θ2] Sin[θ3]
r Cos[θ5] Sin[θ1] Sin[θ2] Sin[θ3] Sin[θ4]
r Cos[θ6] Sin[θ1] Sin[θ2] Sin[θ3] Sin[θ4] Sin[θ5]
r Cos[φ] Sin[θ1] Sin[θ2] Sin[θ3] Sin[θ4] Sin[θ5] Sin[θ6]
r Sin[φ] Sin[θ1] Sin[θ2] Sin[θ3] Sin[θ4] Sin[θ5] Sin[θ6]
```

In[53]:=
```
ta = Table[rand1 = {1, RandomVariate[UniformDistribution[{0, 2 Pi}]], RandomVariate[UniformDistribution[{0, 2 Pi}]]};
   {rand1[[1]] Sin[rand1[[2]]] Cos[rand1[[3]]], rand1[[1]] Sin[rand1[[2]]] Sin[rand1[[3]]], rand1[[1]] Cos[rand1[[2]]]}, {10^4}];
Show[SphericalPlot3D[1, {θ, 0, Pi}, {ϕ, 0, 2 Pi}, PlotStyle → Transparent], Graphics3D[{PointSize[.006], Red, Point[ta]}]]
```

Out[54]=




```
Histogram[tapairwise, 60]
```