Michel Fodje's epr-simple simulation translated from Python to Mathematica by John Reed 13 Nov 2013 Using Joy Christian’s complete state parameters

Set run time parameters, initialize arrays

```
trials = 5 000 000;
trialDeg = 360;

aliceDeg = ConstantArray[0, trials];
bobDeg = ConstantArray[0, trials];
aliceDet = ConstantArray[0, trials];
bobDet = ConstantArray[0, trials];

nPP = ConstantArray[0, trialDeg];
nNN = ConstantArray[0, trialDeg];
nPN = ConstantArray[0, trialDeg];
nNP = ConstantArray[0, trialDeg];
```

Complete State Selection

```
test[angle_, e_, λ_] := Module[{c, out},
  c = -Cos[(angle - e)];
  If[λ ≥ Abs[c], out = 0, out = Sign[c]];
  out]
```

Generate Particle Data

```
Do[
 t = RandomReal[{0, π}];
```

$$\lambda = \left(\frac{2}{\sqrt{1+\frac{3\,t}{\pi}}} - 1\right)(1.21);$$

```
 eLeft = RandomReal[{0, 2 π}];
 eRight = eLeft + π;
 aliceAngle = RandomReal[{0, 2 π}];
 aliceDeg[[i]] = aliceAngle / Degree;
 bobAngle = RandomReal[{0, 2 π}];
 bobDeg[[i]] = bobAngle / Degree;
 aliceDet[[i]] = test[aliceAngle, eLeft, λ];
 bobDet[[i]] = test[bobAngle, eRight, λ],
 {i, trials}]
```

Statistical Analysis of Particle Data

```
Do[
 θ = Round[aliceDeg[[i]] - bobDeg[[i]]];
 aliceD = aliceDet[[i]]; bobD = bobDet[[i]];
 If[aliceD == 1 && bobD == 1, nPP[[θ]] ++];
 If[aliceD == 1 && bobD == -1, nPN[[θ]] ++];
 If[aliceD == -1 && bobD == 1, nNP[[θ]] ++];
 If[aliceD == -1 && bobD == -1, nNN[[θ]] ++],
 {i, trials}]
```

Calculate mean values and plot

```
pPP = 0;  pPN = 0;  pNP = 0; pNN = 0;
```

```
mean = ConstantArray[0, trialDeg];
```

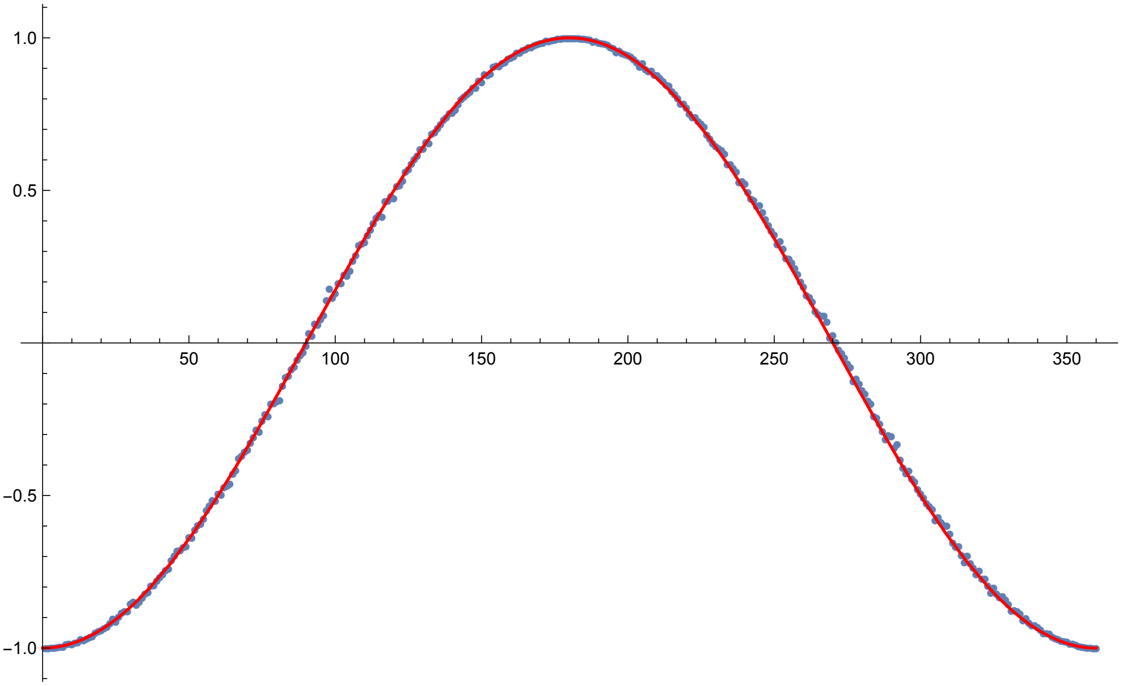
```
Do[
 sum = nPP[[i]] + nPN[[i]] + nNP[[i]] + nNN[[i]];
If[sum == 0, Goto[jump],
   {pPP = nPP[[i]] / sum;
    pNP = nNP[[i]] / sum;
    pPN = nPN[[i]] / sum;
    pNN = nNN[[i]] / sum;
mean[[i]] = pPP + pNN - pPN - pNP}];
 Label[jump],
 {i, trialDeg}]
```

```
simulation = ListPlot[mean, PlotMarkers → {Automatic, Tiny}];
```

```
cos = Plot[-Cos[x Degree], {x, 0, 360}, PlotStyle → {Red}];
```

Compare mean values with -Cosine Curve

```
Show[simulation, cos]
```


1.0
0.5
-0.5
-1.0
50
100
150
200
250
300
350