

$\ln[\sigma] := \sigma = 4 / 5$

```
(*simulator_extended_stabilizer*)
ZeroZeroFirst10simulatorextendedstabilizer = 2052
ZeroOneFirst10simulatorextendedstabilizer = 1156
OneZeroFirst10simulatorextendedstabilizer = 4958
OneOneFirst10simulatorextendedstabilizer = 26

ZeroZeroFirst08simulatorextendedstabilizer = 1798
ZeroOneFirst08simulatorextendedstabilizer = 1615
OneZeroFirst08simulatorextendedstabilizer = 4623
OneOneFirst08simulatorextendedstabilizer = 156

ZeroZeroFirst06simulatorextendedstabilizer = 1545
ZeroOneFirst06simulatorextendedstabilizer = 2626
OneZeroFirst06simulatorextendedstabilizer = 3475
OneOneFirst06simulatorextendedstabilizer = 546

ZeroZeroFirst04simulatorextendedstabilizer = 1049
ZeroOneFirst04simulatorextendedstabilizer = 4132
OneZeroFirst04simulatorextendedstabilizer = 2055
OneOneFirst04simulatorextendedstabilizer = 956

ZeroZeroFirst02simulatorextendedstabilizer = 699
ZeroOneFirst02simulatorextendedstabilizer = 5246
OneZeroFirst02simulatorextendedstabilizer = 1002
OneOneFirst02simulatorextendedstabilizer = 1245

ZeroZeroFirst00simulatorextendedstabilizer = 522
ZeroOneFirst00simulatorextendedstabilizer = 5636
OneZeroFirst00simulatorextendedstabilizer = 613
OneOneFirst00simulatorextendedstabilizer = 1421

ZeroZeroSecond02simulatorextendedstabilizer = 671
ZeroOneSecond02simulatorextendedstabilizer = 5281
OneZeroSecond02simulatorextendedstabilizer = 913
OneOneSecond02simulatorextendedstabilizer = 1327

ZeroZeroSecond04simulatorextendedstabilizer = 1061
ZeroOneSecond04simulatorextendedstabilizer = 4055
OneZeroSecond04simulatorextendedstabilizer = 2151
OneOneSecond04simulatorextendedstabilizer = 925

ZeroZeroSecond06simulatorextendedstabilizer = 1488
ZeroOneSecond06simulatorextendedstabilizer = 2693
OneZeroSecond06simulatorextendedstabilizer = 3456
OneOneSecond06simulatorextendedstabilizer = 555

ZeroZeroSecond08simulatorextendedstabilizer = 1923
ZeroOneSecond08simulatorextendedstabilizer = 1569
OneZeroSecond08simulatorextendedstabilizer = 4540
```

OneOneSecond08simulatorextendedstabilizer = 160

ZeroZeroSecond10simulatorextendedstabilizer = 2052

ZeroOneSecond10simulatorextendedstabilizer = 1156

OneZeroSecond10simulatorextendedstabilizer = 4958

OneOneSecond10simulatorextendedstabilizer = 26

CosSqsimulatorextendedstabilizer =  $\{ \{-1 * \pi, \text{ZeroZeroSecond10simulatorextendedstabilizer} / (\text{OneZeroSecond10simulatorextendedstabilizer} + \text{ZeroZeroSecond10simulatorextendedstabilizer})\},$   
 $\{-0.8 * \pi, \text{ZeroZeroSecond08simulatorextendedstabilizer} / (\text{OneZeroSecond08simulatorextendedstabilizer} + \text{ZeroZeroSecond08simulatorextendedstabilizer})\},$   
 $\{-0.6 * \pi, \text{ZeroZeroSecond06simulatorextendedstabilizer} / (\text{OneZeroSecond06simulatorextendedstabilizer} + \text{ZeroZeroSecond06simulatorextendedstabilizer})\},$   
 $\{-0.4 * \pi, \text{ZeroZeroSecond04simulatorextendedstabilizer} / (\text{OneZeroSecond04simulatorextendedstabilizer} + \text{ZeroZeroSecond04simulatorextendedstabilizer})\},$   
 $\{-0.2 * \pi, \text{ZeroZeroSecond02simulatorextendedstabilizer} / (\text{OneZeroSecond02simulatorextendedstabilizer} + \text{ZeroZeroSecond02simulatorextendedstabilizer})\},$   
 $\{0.0 * \pi, \text{ZeroZeroFirst00simulatorextendedstabilizer} / (\text{OneZeroFirst00simulatorextendedstabilizer} + \text{ZeroZeroFirst00simulatorextendedstabilizer})\},$   
 $\{0.2 * \pi, \text{ZeroZeroFirst02simulatorextendedstabilizer} / (\text{OneZeroFirst02simulatorextendedstabilizer} + \text{ZeroZeroFirst02simulatorextendedstabilizer})\},$   
 $\{0.4 * \pi, \text{ZeroZeroFirst04simulatorextendedstabilizer} / (\text{OneZeroFirst04simulatorextendedstabilizer} + \text{ZeroZeroFirst04simulatorextendedstabilizer})\},$   
 $\{0.6 * \pi, \text{ZeroZeroFirst06simulatorextendedstabilizer} / (\text{OneZeroFirst06simulatorextendedstabilizer} + \text{ZeroZeroFirst06simulatorextendedstabilizer})\},$   
 $\{0.8 * \pi, \text{ZeroZeroFirst08simulatorextendedstabilizer} / (\text{OneZeroFirst08simulatorextendedstabilizer} + \text{ZeroZeroFirst08simulatorextendedstabilizer})\},$   
 $\{1 * \pi, \text{ZeroZeroFirst10simulatorextendedstabilizer} / (\text{OneZeroFirst10simulatorextendedstabilizer} + \text{ZeroZeroFirst10simulatorextendedstabilizer})\} \}$

Decisivenesssimulatorextendedstabilizer =

$\{ \{-1 * \pi, (\text{OneZeroSecond10simulatorextendedstabilizer} + \text{ZeroZeroSecond10simulatorextendedstabilizer}) / 8192\},$   
 $\{-0.8 * \pi, (\text{OneZeroSecond08simulatorextendedstabilizer} + \text{ZeroZeroSecond08simulatorextendedstabilizer}) / 8192\},$   
 $\{-0.6 * \pi, (\text{OneZeroSecond06simulatorextendedstabilizer} + \text{ZeroZeroSecond06simulatorextendedstabilizer}) / 8192\},$

```

{-0.4 *  $\pi$ , (OneZeroSecond04simulatorextendedstabilizer +
  ZeroZeroSecond04simulatorextendedstabilizer) / 8192},
{-0.2 *  $\pi$ , (OneZeroSecond02simulatorextendedstabilizer +
  ZeroZeroSecond02simulatorextendedstabilizer) / 8192},
{-0.0 *  $\pi$ , (OneZeroFirst00simulatorextendedstabilizer +
  ZeroZeroFirst00simulatorextendedstabilizer) / 8192},
{0.2 *  $\pi$ , (OneZeroFirst02simulatorextendedstabilizer +
  ZeroZeroFirst02simulatorextendedstabilizer) / 8192},
{0.4 *  $\pi$ , (OneZeroFirst04simulatorextendedstabilizer +
  ZeroZeroFirst04simulatorextendedstabilizer) / 8192},
{0.6 *  $\pi$ , (OneZeroFirst06simulatorextendedstabilizer +
  ZeroZeroFirst06simulatorextendedstabilizer) / 8192},
{0.8 *  $\pi$ , (OneZeroFirst08simulatorextendedstabilizer +
  ZeroZeroFirst08simulatorextendedstabilizer) / 8192},
{1.0 *  $\pi$ , (OneZeroFirst10simulatorextendedstabilizer +
  ZeroZeroFirst10simulatorextendedstabilizer) / 8192}}
ExpCosSqsimulatorextendedstabilizer = ListPlot[CosSqsimulatorextendedstabilizer]
ExpDecisivenesssimulatorextendedstabilizer =
  ListPlot[Decisivenesssimulatorextendedstabilizer]

```

Out[ ] =  $\frac{4}{5}$

Out[ ] = 2052

Out[ ] = 1156

Out[ ] = 4958

Out[ ] = 26

Out[ ] = 1798

Out[ ] = 1615

Out[ ] = 4623

Out[ ] = 156

Out[ ] = 1545

Out[ ] = 2626

Out[ ] = 3475

Out[ ] = 546

Out[ ] = 1049

Out[ ] = 4132

Out[ ] = 2055

Out[ ] = 956

Out[ ] = 699

$Out[\#]= 5246$

$Out[\#]= 1002$

$Out[\#]= 1245$

$Out[\#]= 522$

$Out[\#]= 5636$

$Out[\#]= 613$

$Out[\#]= 1421$

$Out[\#]= 671$

$Out[\#]= 5281$

$Out[\#]= 913$

$Out[\#]= 1327$

$Out[\#]= 1061$

$Out[\#]= 4055$

$Out[\#]= 2151$

$Out[\#]= 925$

$Out[\#]= 1488$

$Out[\#]= 2693$

$Out[\#]= 3456$

$Out[\#]= 555$

$Out[\#]= 1923$

$Out[\#]= 1569$

$Out[\#]= 4540$

$Out[\#]= 160$

$Out[\#]= 2052$

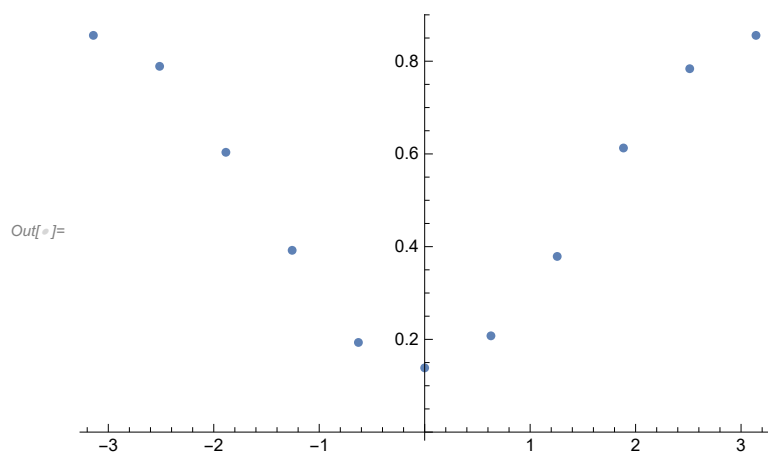
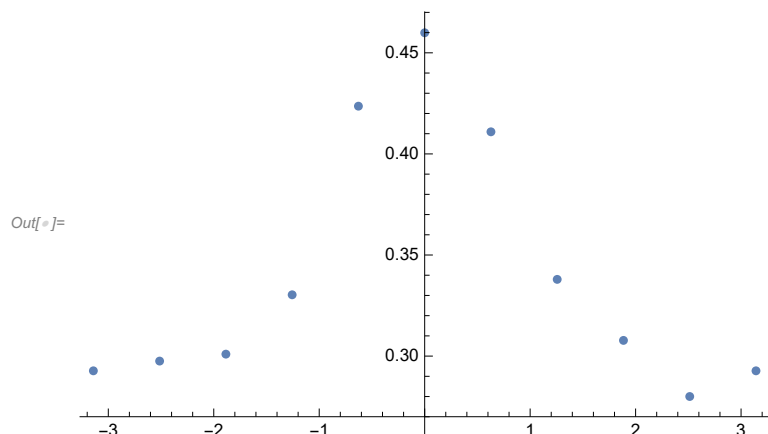
$Out[\#]= 1156$

$Out[\#]= 4958$

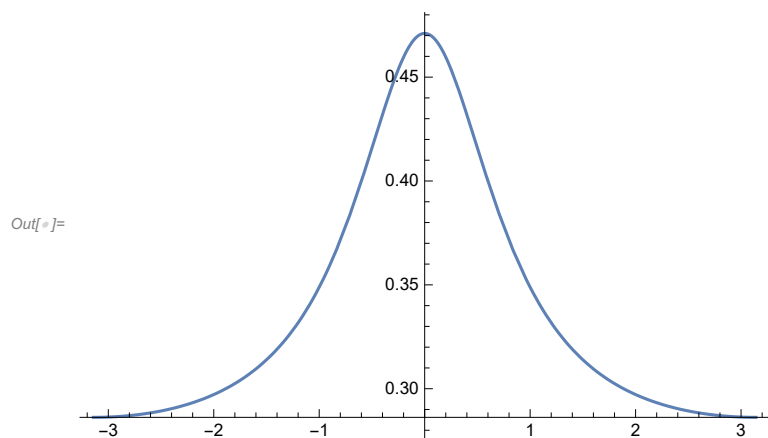
$Out[\#]= 26$

$Out[\#]= \left\{ \left\{ -\pi, \frac{1026}{3505} \right\}, \left\{ -2.51327, \frac{1923}{6463} \right\}, \left\{ -1.88496, \frac{31}{103} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{1061}{3212} \right\}, \left\{ -0.628319, \frac{61}{144} \right\}, \left\{ 0., \frac{522}{1135} \right\}, \left\{ 0.628319, \frac{233}{567} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{1049}{3104} \right\}, \left\{ 1.88496, \frac{309}{1004} \right\}, \left\{ 2.51327, \frac{1798}{6421} \right\}, \left\{ \pi, \frac{1026}{3505} \right\} \right\}$

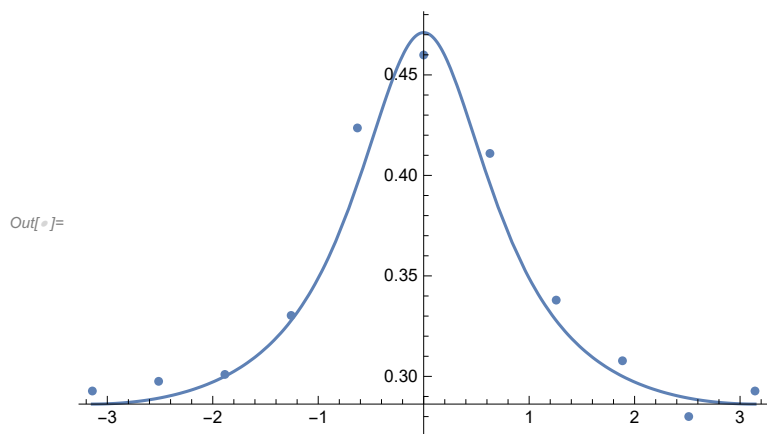
Out[ ]:=  $\left\{ \left\{ -\pi, \frac{3505}{4096} \right\}, \left\{ -2.51327, \frac{6463}{8192} \right\}, \left\{ -1.88496, \frac{309}{512} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{803}{2048} \right\}, \left\{ -0.628319, \frac{99}{512} \right\}, \left\{ 0., \frac{1135}{8192} \right\}, \left\{ 0.628319, \frac{1701}{8192} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{97}{256} \right\}, \left\{ 1.88496, \frac{1255}{2048} \right\}, \left\{ 2.51327, \frac{6421}{8192} \right\}, \left\{ 3.14159, \frac{3505}{4096} \right\} \right\}$



In[ ]:= **cosTH = Plot[1 - N[cosThirdFunction[-x, 4 / 5,  $\pi/2 - 1$ , 1]], {x, - $\pi$ ,  $\pi$ }]**

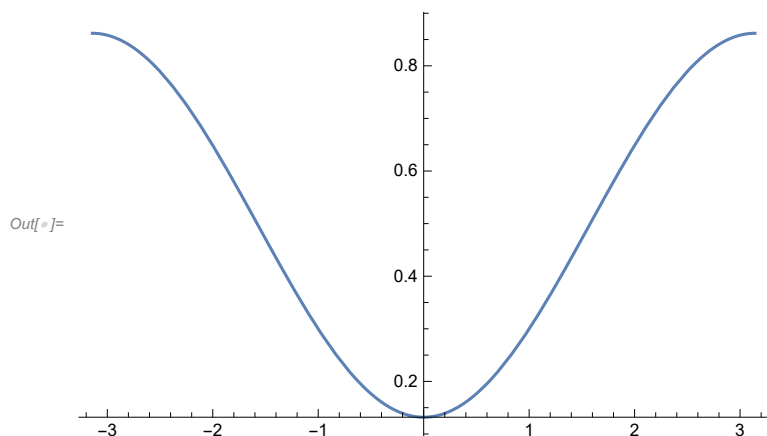


In[ ]:= Show[cosTH, ExpCosSqsimulatorextendedstabilizer, PlotRange → All]

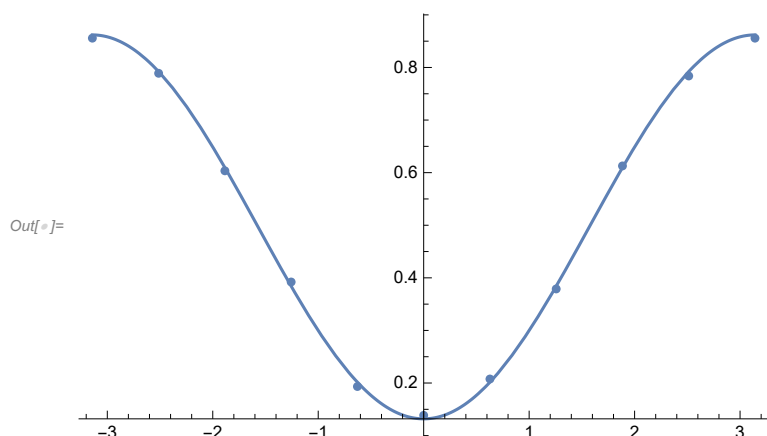


In[ ]:=

In[ ]:= decTH = Plot[DecisivenessThirdFunction[-x, 4/5,  $\pi/2 - 1$ , 3], {x, - $\pi$ ,  $\pi$ }]



In[ ]:= Show[decTH, ExpDecisivenesssimulatorextendedstabilizer, PlotRange → All]



In[ ]:= (\*simulator\_mps\*)

ZeroZeroFirst10simulatormps = 1998

ZeroOneFirst10simulatormps = 1093

OneZeroFirst10simulatormps = 5074

OneOneFirst10simulatormps = 27

ZeroZeroFirst08simulatormps = 1844

ZeroOneFirst08simulatormps = 1557

OneZeroFirst08simulatormps = 4621

OneOneFirst08simulatormps = 170

ZeroZeroFirst06simulatormps = 1507

ZeroOneFirst06simulatormps = 2633

OneZeroFirst06simulatormps = 3507

OneOneFirst06simulatormps = 545

ZeroZeroFirst04simulatormps = 966

ZeroOneFirst04simulatormps = 4122

OneZeroFirst04simulatormps = 2110

OneOneFirst04simulatormps = 994

ZeroZeroFirst02simulatormps = 665

ZeroOneFirst02simulatormps = 5233

OneZeroFirst02simulatormps = 957

OneOneFirst02simulatormps = 1337

ZeroZeroFirst00simulatormps = 534

ZeroOneFirst00simulatormps = 5578

OneZeroFirst00simulatormps = 578

OneOneFirst00simulatormps = 1502

ZeroZeroSecond02simulatormps = 689

ZeroOneSecond02simulatormps = 5139

OneZeroSecond02simulatormps = 1006

OneOneSecond02simulatormps = 1358

ZeroZeroSecond04simulatormps = 1009

ZeroOneSecond04simulatormps = 4089

OneZeroSecond04simulatormps = 2158

OneOneSecond04simulatormps = 936

ZeroZeroSecond06simulatormps = 1504

ZeroOneSecond06simulatormps = 2644

OneZeroSecond06simulatormps = 3556

OneOneSecond06simulatormps = 488

ZeroZeroSecond08simulatormps = 1855

ZeroOneSecond08simulatormps = 1550

OneZeroSecond08simulatormps = 4636

OneOneSecond08simulatormps = 151

ZeroZeroSecond10simulatormps = 1998

ZeroOneSecond10simulatormps = 1093

OneZeroSecond10simulatormps = 5074

OneOneSecond10simulatormps = 27

```

CosSqsimulatoremps = {{-1 *  $\pi$ , ZeroZeroSecond10simulatoremps /
  (OneZeroSecond10simulatoremps + ZeroZeroSecond10simulatoremps)},
{-0.8 *  $\pi$ , ZeroZeroSecond08simulatoremps /
  (OneZeroSecond08simulatoremps + ZeroZeroSecond08simulatoremps)},
{-0.6 *  $\pi$ , ZeroZeroSecond06simulatoremps /
  (OneZeroSecond06simulatoremps + ZeroZeroSecond06simulatoremps)},
{-0.4 *  $\pi$ , ZeroZeroSecond04simulatoremps /
  (OneZeroSecond04simulatoremps + ZeroZeroSecond04simulatoremps)},
{-0.2 *  $\pi$ , ZeroZeroSecond02simulatoremps /
  (OneZeroSecond02simulatoremps + ZeroZeroSecond02simulatoremps)},
{0.0 *  $\pi$ , ZeroZeroFirst00simulatoremps / (OneZeroFirst00simulatoremps +
  ZeroZeroFirst00simulatoremps)}, {0.2 *  $\pi$ , ZeroZeroFirst02simulatoremps /
  (OneZeroFirst02simulatoremps + ZeroZeroFirst02simulatoremps)},
{0.4 *  $\pi$ , ZeroZeroFirst04simulatoremps / (OneZeroFirst04simulatoremps +
  ZeroZeroFirst04simulatoremps)}, {0.6 *  $\pi$ , ZeroZeroFirst06simulatoremps /
  (OneZeroFirst06simulatoremps + ZeroZeroFirst06simulatoremps)},
{0.8 *  $\pi$ , ZeroZeroFirst08simulatoremps / (OneZeroFirst08simulatoremps +
  ZeroZeroFirst08simulatoremps)}, {1 *  $\pi$ , ZeroZeroFirst10simulatoremps /
  (OneZeroFirst10simulatoremps + ZeroZeroFirst10simulatoremps)}}
Decisivenesssimulatoremps = {{-1 *  $\pi$ ,
  (OneZeroSecond10simulatoremps + ZeroZeroSecond10simulatoremps) / 8192},
{-0.8 *  $\pi$ , (OneZeroSecond08simulatoremps + ZeroZeroSecond08simulatoremps) / 8192},
{-0.6 *  $\pi$ , (OneZeroSecond06simulatoremps + ZeroZeroSecond06simulatoremps) / 8192},
{-0.4 *  $\pi$ , (OneZeroSecond04simulatoremps + ZeroZeroSecond04simulatoremps) / 8192},
{-0.2 *  $\pi$ , (OneZeroSecond02simulatoremps + ZeroZeroSecond02simulatoremps) / 8192},
{-0.0 *  $\pi$ , (OneZeroFirst00simulatoremps + ZeroZeroFirst00simulatoremps) / 8192},
{0.2 *  $\pi$ , (OneZeroFirst02simulatoremps + ZeroZeroFirst02simulatoremps) / 8192},
{0.4 *  $\pi$ , (OneZeroFirst04simulatoremps + ZeroZeroFirst04simulatoremps) / 8192},
{0.6 *  $\pi$ , (OneZeroFirst06simulatoremps + ZeroZeroFirst06simulatoremps) / 8192},
{0.8 *  $\pi$ , (OneZeroFirst08simulatoremps + ZeroZeroFirst08simulatoremps) / 8192},
{1.0 *  $\pi$ , (OneZeroFirst10simulatoremps + ZeroZeroFirst10simulatoremps) / 8192}}
ExpCosSqsimulatoremps = ListPlot[CosSqsimulatoremps]
ExpDecisivenesssimulatoremps = ListPlot[Decisivenesssimulatoremps]

```

Out[ ]= 1998

Out[ ]= 1093

Out[ ]= 5074

Out[ ]= 27

Out[ ]= 1844

Out[ ]= 1557

Out[ ]= 4621

Out[ ]= 170



$Out[ \ast ] = 1507$

$Out[ \ast ] = 2633$

$Out[ \ast ] = 3507$

$Out[ \ast ] = 545$

$Out[ \ast ] = 966$

$Out[ \ast ] = 4122$

$Out[ \ast ] = 2110$

$Out[ \ast ] = 994$

$Out[ \ast ] = 665$

$Out[ \ast ] = 5233$

$Out[ \ast ] = 957$

$Out[ \ast ] = 1337$

$Out[ \ast ] = 534$

$Out[ \ast ] = 5578$

$Out[ \ast ] = 578$

$Out[ \ast ] = 1502$

$Out[ \ast ] = 689$

$Out[ \ast ] = 5139$

$Out[ \ast ] = 1006$

$Out[ \ast ] = 1358$

$Out[ \ast ] = 1009$

$Out[ \ast ] = 4089$

$Out[ \ast ] = 2158$

$Out[ \ast ] = 936$

$Out[ \ast ] = 1504$

$Out[ \ast ] = 2644$

$Out[ \ast ] = 3556$

$Out[ \ast ] = 488$

$Out[ \ast ] = 1855$

$Out[ \ast ] = 1550$

$Out[ \ast ] = 4636$

Out[ ]= 151

Out[ ]= 1998

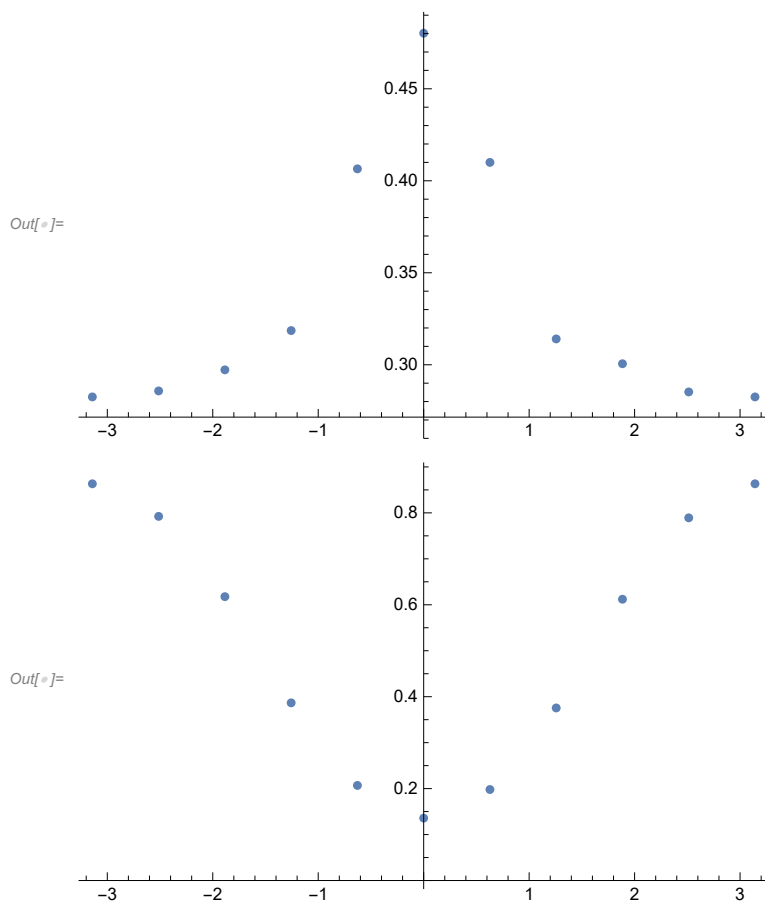
Out[ ]= 1093

Out[ ]= 5074

Out[ ]= 27

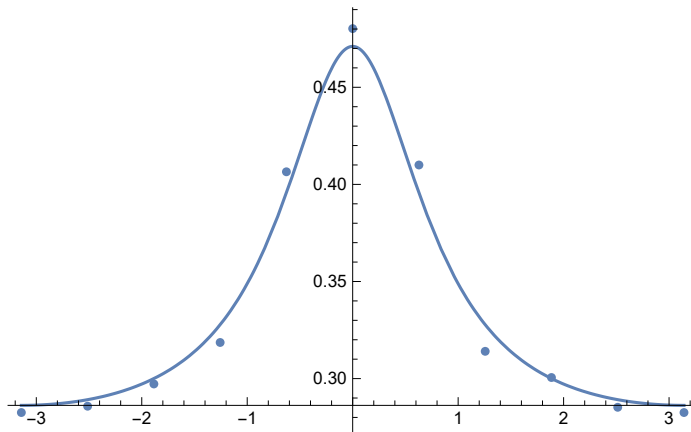
Out[ ]=  $\left\{ \left\{ -\pi, \frac{999}{3536} \right\}, \left\{ -2.51327, \frac{1855}{6491} \right\}, \left\{ -1.88496, \frac{376}{1265} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{1009}{3167} \right\}, \left\{ -0.628319, \frac{689}{1695} \right\}, \left\{ 0., \frac{267}{556} \right\}, \left\{ 0.628319, \frac{665}{1622} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{483}{1538} \right\}, \left\{ 1.88496, \frac{1507}{5014} \right\}, \left\{ 2.51327, \frac{1844}{6465} \right\}, \left\{ \pi, \frac{999}{3536} \right\} \right\}$

Out[ ]=  $\left\{ \left\{ -\pi, \frac{221}{256} \right\}, \left\{ -2.51327, \frac{6491}{8192} \right\}, \left\{ -1.88496, \frac{1265}{2048} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{3167}{8192} \right\}, \left\{ -0.628319, \frac{1695}{8192} \right\}, \left\{ 0., \frac{139}{1024} \right\}, \left\{ 0.628319, \frac{811}{4096} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{769}{2048} \right\}, \left\{ 1.88496, \frac{2507}{4096} \right\}, \left\{ 2.51327, \frac{6465}{8192} \right\}, \left\{ 3.14159, \frac{221}{256} \right\} \right\}$



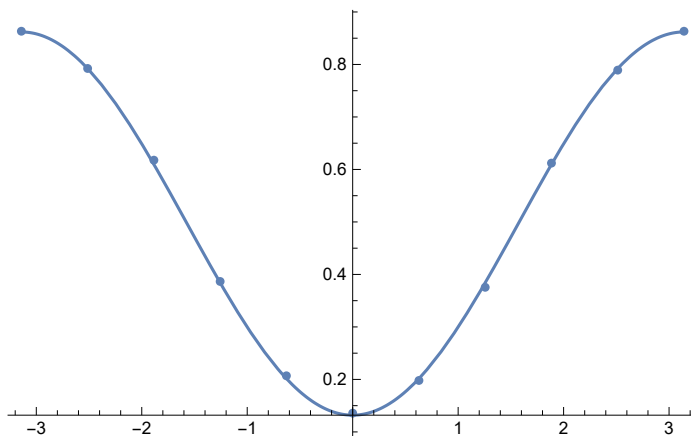
In[ ]:= Show[cosTH, ExpCosSqsimulatormps, PlotRange → All]

Out[ ]:=



In[ ]:= Show[decTH, ExpDecisivenesssimulatormps, PlotRange → All]

Out[ ]:=



In[ ]:= (\*simulator\_statevector\*)

ZeroZeroFirst10simulatorstatevector = 1990  
 ZeroOneFirst10simulatorstatevector = 1111  
 OneZeroFirst10simulatorstatevector = 5066  
 OneOneFirst10simulatorstatevector = 25

ZeroZeroFirst08simulatorstatevector = 1826  
 ZeroOneFirst08simulatorstatevector = 1565  
 OneZeroFirst08simulatorstatevector = 4623  
 OneOneFirst08simulatorstatevector = 178

ZeroZeroFirst06simulatorstatevector = 1530  
 ZeroOneFirst06simulatorstatevector = 2649  
 OneZeroFirst06simulatorstatevector = 3518  
 OneOneFirst06simulatorstatevector = 495

ZeroZeroFirst04simulatorstatevector = 995  
 ZeroOneFirst04simulatorstatevector = 4108  
 OneZeroFirst04simulatorstatevector = 2098  
 OneOneFirst04simulatorstatevector = 991

ZeroZeroFirst02simulatorstatevector = 649  
 ZeroOneFirst02simulatorstatevector = 5138  
 OneZeroFirst02simulatorstatevector = 989  
 OneOneFirst02simulatorstatevector = 1416

ZeroZeroFirst00simulatorstatevector = 474  
 ZeroOneFirst00simulatorstatevector = 5675  
 OneZeroFirst00simulatorstatevector = 530  
 OneOneFirst00simulatorstatevector = 1513

ZeroZeroSecond02simulatorstatevector = 620  
 ZeroOneSecond02simulatorstatevector = 5249  
 OneZeroSecond02simulatorstatevector = 1014  
 OneOneSecond02simulatorstatevector = 1309

ZeroZeroSecond04simulatorstatevector = 1026  
 ZeroOneSecond04simulatorstatevector = 4048  
 OneZeroSecond04simulatorstatevector = 2097  
 OneOneSecond04simulatorstatevector = 1021

ZeroZeroSecond06simulatorstatevector = 1538  
 ZeroOneSecond06simulatorstatevector = 2647  
 OneZeroSecond06simulatorstatevector = 3460  
 OneOneSecond06simulatorstatevector = 547

ZeroZeroSecond08simulatorstatevector = 1902  
 ZeroOneSecond08simulatorstatevector = 1524  
 OneZeroSecond08simulatorstatevector = 4603  
 OneOneSecond08simulatorstatevector = 163

ZeroZeroSecond10simulatorstatevector = 1990  
 ZeroOneSecond10simulatorstatevector = 1111  
 OneZeroSecond10simulatorstatevector = 5066  
 OneOneSecond10simulatorstatevector = 25

CosSqsimulatorstatevector =  $\left\{ \left\{ -1 * \pi, \text{ZeroZeroSecond10simulatorstatevector} / \right. \right.$   
 $\left. \left( \text{OneZeroSecond10simulatorstatevector} + \text{ZeroZeroSecond10simulatorstatevector} \right) \right\},$   
 $\left\{ -0.8 * \pi, \text{ZeroZeroSecond08simulatorstatevector} / \right.$   
 $\left. \left( \text{OneZeroSecond08simulatorstatevector} + \text{ZeroZeroSecond08simulatorstatevector} \right) \right\},$   
 $\left\{ -0.6 * \pi, \text{ZeroZeroSecond06simulatorstatevector} / \right.$   
 $\left. \left( \text{OneZeroSecond06simulatorstatevector} + \text{ZeroZeroSecond06simulatorstatevector} \right) \right\},$   
 $\left\{ -0.4 * \pi, \text{ZeroZeroSecond04simulatorstatevector} / \right.$   
 $\left. \left( \text{OneZeroSecond04simulatorstatevector} + \text{ZeroZeroSecond04simulatorstatevector} \right) \right\},$   
 $\left\{ -0.2 * \pi, \text{ZeroZeroSecond02simulatorstatevector} / \right.$   
 $\left. \left( \text{OneZeroSecond02simulatorstatevector} + \text{ZeroZeroSecond02simulatorstatevector} \right) \right\},$   
 $\left\{ 0.0 * \pi, \text{ZeroZeroFirst00simulatorstatevector} / \right.$   
 $\left. \left( \text{OneZeroFirst00simulatorstatevector} + \text{ZeroZeroFirst00simulatorstatevector} \right) \right\},$   
 $\left\{ 0.2 * \pi, \text{ZeroZeroFirst02simulatorstatevector} / \right.$   
 $\left. \left( \text{OneZeroFirst02simulatorstatevector} + \text{ZeroZeroFirst02simulatorstatevector} \right) \right\},$   
 $\left\{ 0.4 * \pi, \text{ZeroZeroFirst04simulatorstatevector} / \right.$

```

(OneZeroFirst04simulatorstatevector + ZeroZeroFirst04simulatorstatevector)},
{0.6 *  $\pi$ , ZeroZeroFirst06simulatorstatevector /
(OneZeroFirst06simulatorstatevector + ZeroZeroFirst06simulatorstatevector)},
{0.8 *  $\pi$ , ZeroZeroFirst08simulatorstatevector /
(OneZeroFirst08simulatorstatevector + ZeroZeroFirst08simulatorstatevector)},
{1 *  $\pi$ , ZeroZeroFirst10simulatorstatevector /
(OneZeroFirst10simulatorstatevector + ZeroZeroFirst10simulatorstatevector)}}
Decisivenesssimulatorstatevector = {{-1 *  $\pi$ ,
(OneZeroSecond10simulatorstatevector + ZeroZeroSecond10simulatorstatevector) / 8192},
{-0.8 *  $\pi$ , (OneZeroSecond08simulatorstatevector + ZeroZeroSecond08simulatorstatevector) /
8192}, {-0.6 *  $\pi$ ,
(OneZeroSecond06simulatorstatevector + ZeroZeroSecond06simulatorstatevector) / 8192},
{-0.4 *  $\pi$ , (OneZeroSecond04simulatorstatevector + ZeroZeroSecond04simulatorstatevector) /
8192}, {-0.2 *  $\pi$ ,
(OneZeroSecond02simulatorstatevector + ZeroZeroSecond02simulatorstatevector) / 8192},
{-0.0 *  $\pi$ , (OneZeroFirst00simulatorstatevector + ZeroZeroFirst00simulatorstatevector) /
8192}, {0.2 *  $\pi$ ,
(OneZeroFirst02simulatorstatevector + ZeroZeroFirst02simulatorstatevector) / 8192},
{0.4 *  $\pi$ , (OneZeroFirst04simulatorstatevector + ZeroZeroFirst04simulatorstatevector) /
8192}, {0.6 *  $\pi$ ,
(OneZeroFirst06simulatorstatevector + ZeroZeroFirst06simulatorstatevector) / 8192},
{0.8 *  $\pi$ , (OneZeroFirst08simulatorstatevector + ZeroZeroFirst08simulatorstatevector) /
8192}, {1.0 *  $\pi$ ,
(OneZeroFirst10simulatorstatevector + ZeroZeroFirst10simulatorstatevector) / 8192}}
ExpCosSqsimulatorstatevector = ListPlot[CosSqsimulatorstatevector]
ExpDecisivenesssimulatorstatevector = ListPlot[Decisivenesssimulatorstatevector]

```

Out[ ]= 1990

Out[ ]= 1111

Out[ ]= 5066

Out[ ]= 25

Out[ ]= 1826

Out[ ]= 1565

Out[ ]= 4623

Out[ ]= 178

Out[ ]= 1530

Out[ ]= 2649

Out[ ]= 3518

Out[ ]= 495

Out[ ]= 995

Out[ ]= 4108

*Out[ ]=* 2098

*Out[ ]=* 991

*Out[ ]=* 649

*Out[ ]=* 5138

*Out[ ]=* 989

*Out[ ]=* 1416

*Out[ ]=* 474

*Out[ ]=* 5675

*Out[ ]=* 530

*Out[ ]=* 1513

*Out[ ]=* 620

*Out[ ]=* 5249

*Out[ ]=* 1014

*Out[ ]=* 1309

*Out[ ]=* 1026

*Out[ ]=* 4048

*Out[ ]=* 2097

*Out[ ]=* 1021

*Out[ ]=* 1538

*Out[ ]=* 2647

*Out[ ]=* 3460

*Out[ ]=* 547

*Out[ ]=* 1902

*Out[ ]=* 1524

*Out[ ]=* 4603

*Out[ ]=* 163

*Out[ ]=* 1990

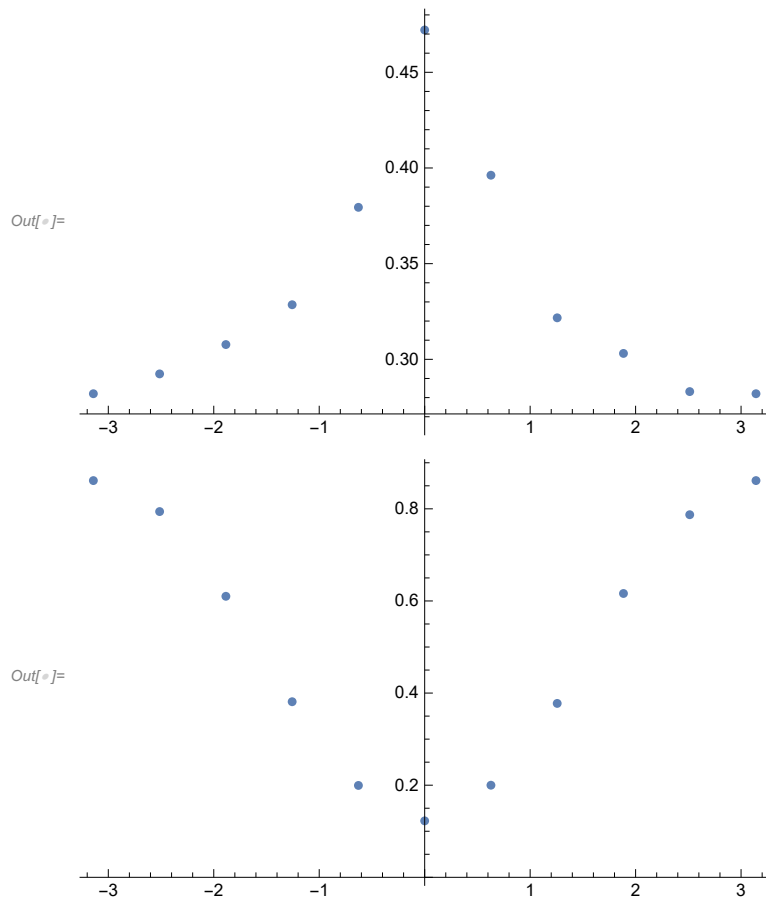
*Out[ ]=* 1111

*Out[ ]=* 5066

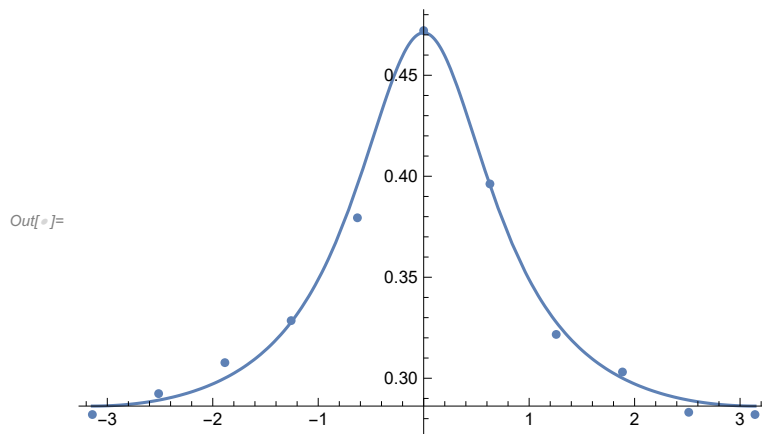
*Out[ ]=* 25

$$\text{Out}[*]= \left\{ \left\{ -\pi, \frac{995}{3528} \right\}, \left\{ -2.51327, \frac{1902}{6505} \right\}, \left\{ -1.88496, \frac{769}{2499} \right\}, \right. \\ \left. \left\{ -1.25664, \frac{114}{347} \right\}, \left\{ -0.628319, \frac{310}{817} \right\}, \left\{ 0., \frac{237}{502} \right\}, \left\{ 0.628319, \frac{649}{1638} \right\}, \right. \\ \left. \left\{ 1.25664, \frac{995}{3093} \right\}, \left\{ 1.88496, \frac{765}{2524} \right\}, \left\{ 2.51327, \frac{1826}{6449} \right\}, \left\{ \pi, \frac{995}{3528} \right\} \right\}$$

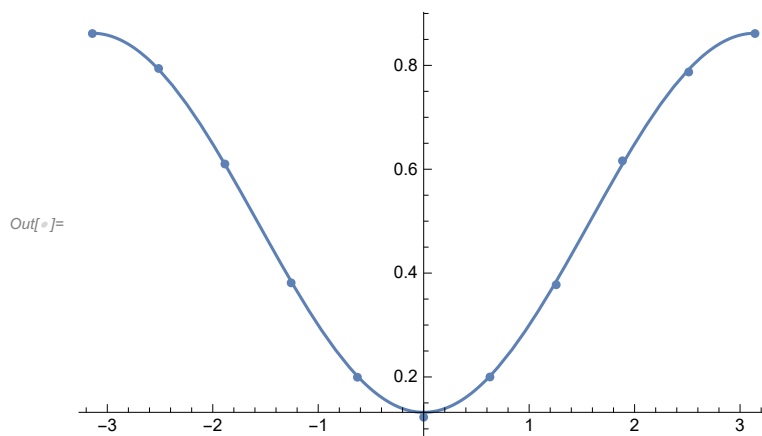
$$\text{Out}[*]= \left\{ \left\{ -\pi, \frac{441}{512} \right\}, \left\{ -2.51327, \frac{6505}{8192} \right\}, \left\{ -1.88496, \frac{2499}{4096} \right\}, \right. \\ \left. \left\{ -1.25664, \frac{3123}{8192} \right\}, \left\{ -0.628319, \frac{817}{4096} \right\}, \left\{ 0., \frac{251}{2048} \right\}, \left\{ 0.628319, \frac{819}{4096} \right\}, \right. \\ \left. \left\{ 1.25664, \frac{3093}{8192} \right\}, \left\{ 1.88496, \frac{631}{1024} \right\}, \left\{ 2.51327, \frac{6449}{8192} \right\}, \left\{ 3.14159, \frac{441}{512} \right\} \right\}$$



```
In[ ]:= Show[cosTH, ExpCosSqsimulatorstatevector, PlotRange -> All]
```



```
In[ ]:= Show[decTH, ExpDecisivenesssimulatorstatevector, PlotRange -> All]
```



```
In[ ]:= (*ibm_nairobi*)
ZeroZeroFirst10ibmnairobi = 2162
ZeroOneFirst10ibmnairobi = 906
OneZeroFirst10ibmnairobi = 5004
OneOneFirst10ibmnairobi = 120

ZeroZeroFirst08ibmnairobi = 1998
ZeroOneFirst08ibmnairobi = 1162
OneZeroFirst08ibmnairobi = 4860
OneOneFirst08ibmnairobi = 172

ZeroZeroFirst06ibmnairobi = 1676
ZeroOneFirst06ibmnairobi = 2180
OneZeroFirst06ibmnairobi = 3856
OneOneFirst06ibmnairobi = 480

ZeroZeroFirst04ibmnairobi = 1305
ZeroOneFirst04ibmnairobi = 3539
OneZeroFirst04ibmnairobi = 2424
OneOneFirst04ibmnairobi = 924
```



ZeroZeroFirst02ibmnairobi = 985  
 ZeroOneFirst02ibmnairobi = 4688  
 OneZeroFirst02ibmnairobi = 1118  
 OneOneFirst02ibmnairobi = 1401

ZeroZeroFirst00ibmnairobi = 783  
 ZeroOneFirst00ibmnairobi = 5152  
 OneZeroFirst00ibmnairobi = 671  
 OneOneFirst00ibmnairobi = 1586

ZeroZeroSecond02ibmnairobi = 823  
 ZeroOneSecond02ibmnairobi = 4853  
 OneZeroSecond02ibmnairobi = 1043  
 OneOneSecond02ibmnairobi = 1473

ZeroZeroSecond04ibmnairobi = 1131  
 ZeroOneSecond04ibmnairobi = 3841  
 OneZeroSecond04ibmnairobi = 2028  
 OneOneSecond04ibmnairobi = 1192

ZeroZeroSecond06ibmnairobi = 1469  
 ZeroOneSecond06ibmnairobi = 2658  
 OneZeroSecond06ibmnairobi = 3248  
 OneOneSecond06ibmnairobi = 817

ZeroZeroSecond08ibmnairobi = 1870  
 ZeroOneSecond08ibmnairobi = 1377  
 OneZeroSecond08ibmnairobi = 4572  
 OneOneSecond08ibmnairobi = 373

ZeroZeroSecond10ibmnairobi = 2162  
 ZeroOneSecond10ibmnairobi = 906  
 OneZeroSecond10ibmnairobi = 5004  
 OneOneSecond10ibmnairobi = 120

CosSqibmnairobi =  $\{ \{-1 * \pi,$   
      $\text{ZeroZeroSecond10ibmnairobi} / (\text{OneZeroSecond10ibmnairobi} + \text{ZeroZeroSecond10ibmnairobi}) \},$   
 $\{-0.8 * \pi, \text{ZeroZeroSecond08ibmnairobi} /$   
      $(\text{OneZeroSecond08ibmnairobi} + \text{ZeroZeroSecond08ibmnairobi}) \}, \{-0.6 * \pi,$   
      $\text{ZeroZeroSecond06ibmnairobi} / (\text{OneZeroSecond06ibmnairobi} + \text{ZeroZeroSecond06ibmnairobi}) \},$   
 $\{-0.4 * \pi, \text{ZeroZeroSecond04ibmnairobi} /$   
      $(\text{OneZeroSecond04ibmnairobi} + \text{ZeroZeroSecond04ibmnairobi}) \}, \{-0.2 * \pi,$   
      $\text{ZeroZeroSecond02ibmnairobi} / (\text{OneZeroSecond02ibmnairobi} + \text{ZeroZeroSecond02ibmnairobi}) \},$   
 $\{0.0 * \pi, \text{ZeroZeroFirst00ibmnairobi} /$   
      $(\text{OneZeroFirst00ibmnairobi} + \text{ZeroZeroFirst00ibmnairobi}) \}, \{0.2 * \pi,$   
      $\text{ZeroZeroFirst02ibmnairobi} / (\text{OneZeroFirst02ibmnairobi} + \text{ZeroZeroFirst02ibmnairobi}) \},$   
 $\{0.4 * \pi, \text{ZeroZeroFirst04ibmnairobi} /$   
      $(\text{OneZeroFirst04ibmnairobi} + \text{ZeroZeroFirst04ibmnairobi}) \}, \{0.6 * \pi,$   
      $\text{ZeroZeroFirst06ibmnairobi} / (\text{OneZeroFirst06ibmnairobi} + \text{ZeroZeroFirst06ibmnairobi}) \},$   
 $\{0.8 * \pi, \text{ZeroZeroFirst08ibmnairobi} /$

```

      (OneZeroFirst08ibmnairobi + ZeroZeroFirst08ibmnairobi)}, {1 *  $\pi$ ,
      ZeroZeroFirst10ibmnairobi / (OneZeroFirst10ibmnairobi + ZeroZeroFirst10ibmnairobi)}}
Decisivenessibmnairobi = {{-1 *  $\pi$ , (OneZeroSecond10ibmnairobi + ZeroZeroSecond10ibmnairobi) /
      8192}, {-0.8 *  $\pi$ , (OneZeroSecond08ibmnairobi + ZeroZeroSecond08ibmnairobi) / 8192},
      {-0.6 *  $\pi$ , (OneZeroSecond06ibmnairobi + ZeroZeroSecond06ibmnairobi) / 8192},
      {-0.4 *  $\pi$ , (OneZeroSecond04ibmnairobi + ZeroZeroSecond04ibmnairobi) / 8192},
      {-0.2 *  $\pi$ , (OneZeroSecond02ibmnairobi + ZeroZeroSecond02ibmnairobi) / 8192},
      {-0.0 *  $\pi$ , (OneZeroFirst00ibmnairobi + ZeroZeroFirst00ibmnairobi) / 8192},
      {0.2 *  $\pi$ , (OneZeroFirst02ibmnairobi + ZeroZeroFirst02ibmnairobi) / 8192},
      {0.4 *  $\pi$ , (OneZeroFirst04ibmnairobi + ZeroZeroFirst04ibmnairobi) / 8192},
      {0.6 *  $\pi$ , (OneZeroFirst06ibmnairobi + ZeroZeroFirst06ibmnairobi) / 8192},
      {0.8 *  $\pi$ , (OneZeroFirst08ibmnairobi + ZeroZeroFirst08ibmnairobi) / 8192},
      {1.0 *  $\pi$ , (OneZeroFirst10ibmnairobi + ZeroZeroFirst10ibmnairobi) / 8192}}
ExpCosSqibmnairobi = ListPlot[CosSqibmnairobi]
ExpDecisivenessibmnairobi = ListPlot[Decisivenessibmnairobi]

```

Out[ ]= 2162

Out[ ]= 906

Out[ ]= 5004

Out[ ]= 120

Out[ ]= 1998

Out[ ]= 1162

Out[ ]= 4860

Out[ ]= 172

Out[ ]= 1676

Out[ ]= 2180

Out[ ]= 3856

Out[ ]= 480

Out[ ]= 1305

Out[ ]= 3539

Out[ ]= 2424

Out[ ]= 924

Out[ ]= 985

Out[ ]= 4688

Out[ ]= 1118

Out[ ]= 1401

Out[ ]= 783

$$\text{Out}[*]= 5152$$

$$\text{Out}[*]= 671$$

$$\text{Out}[*]= 1586$$

$$\text{Out}[*]= 823$$

$$\text{Out}[*]= 4853$$

$$\text{Out}[*]= 1043$$

$$\text{Out}[*]= 1473$$

$$\text{Out}[*]= 1131$$

$$\text{Out}[*]= 3841$$

$$\text{Out}[*]= 2028$$

$$\text{Out}[*]= 1192$$

$$\text{Out}[*]= 1469$$

$$\text{Out}[*]= 2658$$

$$\text{Out}[*]= 3248$$

$$\text{Out}[*]= 817$$

$$\text{Out}[*]= 1870$$

$$\text{Out}[*]= 1377$$

$$\text{Out}[*]= 4572$$

$$\text{Out}[*]= 373$$

$$\text{Out}[*]= 2162$$

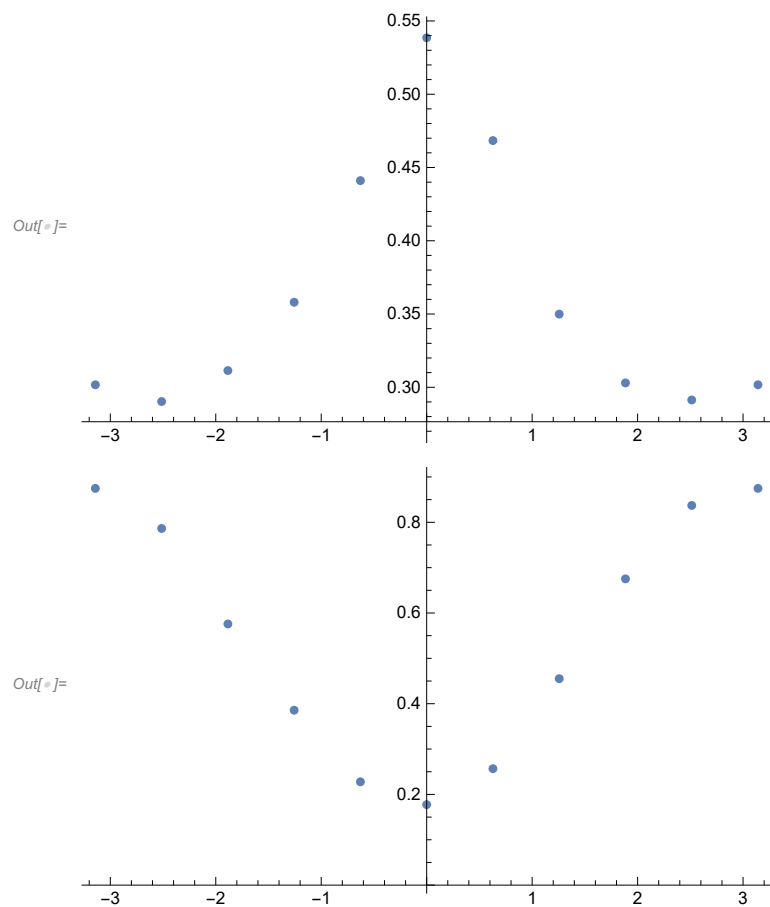
$$\text{Out}[*]= 906$$

$$\text{Out}[*]= 5004$$

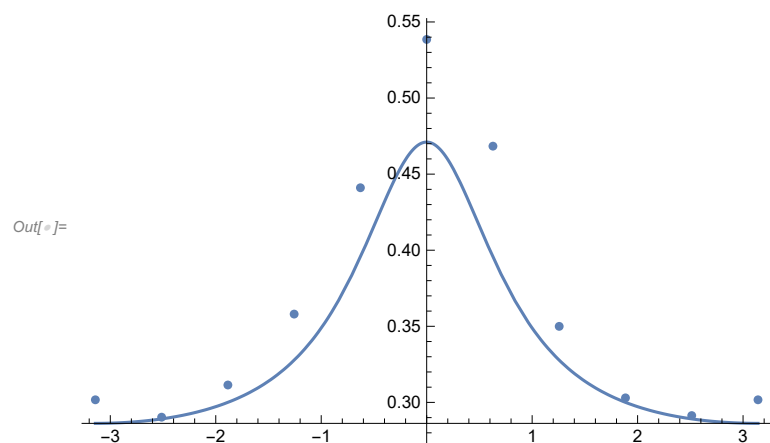
$$\text{Out}[*]= 120$$

$$\begin{aligned} \text{Out}[*]= & \left\{ \left\{ -\pi, \frac{1081}{3583} \right\}, \left\{ -2.51327, \frac{935}{3221} \right\}, \left\{ -1.88496, \frac{1469}{4717} \right\}, \right. \\ & \left\{ -1.25664, \frac{29}{81} \right\}, \left\{ -0.628319, \frac{823}{1866} \right\}, \left\{ 0., \frac{783}{1454} \right\}, \left\{ 0.628319, \frac{985}{2103} \right\}, \\ & \left. \left\{ 1.25664, \frac{435}{1243} \right\}, \left\{ 1.88496, \frac{419}{1383} \right\}, \left\{ 2.51327, \frac{37}{127} \right\}, \left\{ \pi, \frac{1081}{3583} \right\} \right\} \end{aligned}$$

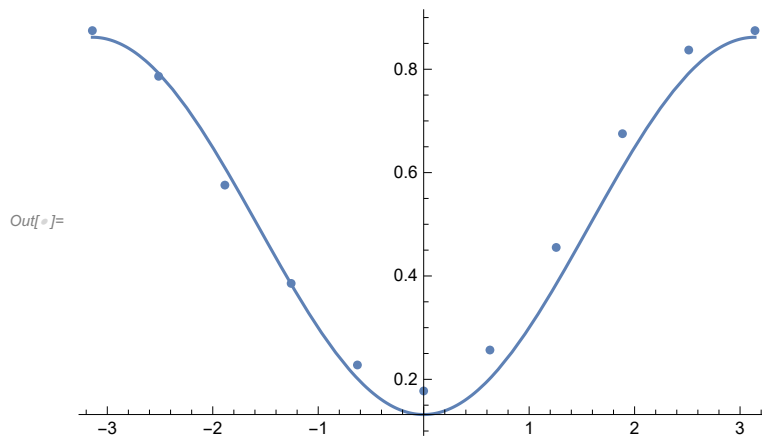
Out[ ]:=  $\left\{ \left\{ -\pi, \frac{3583}{4096} \right\}, \left\{ -2.51327, \frac{3221}{4096} \right\}, \left\{ -1.88496, \frac{4717}{8192} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{3159}{8192} \right\}, \left\{ -0.628319, \frac{933}{4096} \right\}, \left\{ 0., \frac{727}{4096} \right\}, \left\{ 0.628319, \frac{2103}{8192} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{3729}{8192} \right\}, \left\{ 1.88496, \frac{1383}{2048} \right\}, \left\{ 2.51327, \frac{3429}{4096} \right\}, \left\{ 3.14159, \frac{3583}{4096} \right\} \right\}$



In[ ]:= **Show[cosh, ExpCosSqibmnairobi, PlotRange → All]**



In[ ]:= Show[decTH, ExpDecisivenessibmnairobi, PlotRange → All]



In[ ]:= (\*ibm\_oslo\*)

ZeroZeroFirst10ibmoslo = 1956  
 ZeroOneFirst10ibmoslo = 1207  
 OneZeroFirst10ibmoslo = 4797  
 OneOneFirst10ibmoslo = 232

ZeroZeroFirst08ibmoslo = 1939  
 ZeroOneFirst08ibmoslo = 1506  
 OneZeroFirst08ibmoslo = 4413  
 OneOneFirst08ibmoslo = 334

ZeroZeroFirst06ibmoslo = 1514  
 ZeroOneFirst06ibmoslo = 2620  
 OneZeroFirst06ibmoslo = 3450  
 OneOneFirst06ibmoslo = 608

ZeroZeroFirst04ibmoslo = 1060  
 ZeroOneFirst04ibmoslo = 3960  
 OneZeroFirst04ibmoslo = 2138  
 OneOneFirst04ibmoslo = 1034

ZeroZeroFirst02ibmoslo = 710  
 ZeroOneFirst02ibmoslo = 5182  
 OneZeroFirst02ibmoslo = 1055  
 OneOneFirst02ibmoslo = 1245

ZeroZeroFirst00ibmoslo = 570  
 ZeroOneFirst00ibmoslo = 5547  
 OneZeroFirst00ibmoslo = 664  
 OneOneFirst00ibmoslo = 1411

ZeroZeroSecond02ibmoslo = 672  
 ZeroOneSecond02ibmoslo = 5144  
 OneZeroSecond02ibmoslo = 1098  
 OneOneSecond02ibmoslo = 1278

```

ZeroZeroSecond04ibmoslo = 994
ZeroOneSecond04ibmoslo = 4135
OneZeroSecond04ibmoslo = 2062
OneOneSecond04ibmoslo = 1001

```

```

ZeroZeroSecond06ibmoslo = 1444
ZeroOneSecond06ibmoslo = 2852
OneZeroSecond06ibmoslo = 3243
OneOneSecond06ibmoslo = 653

```

```

ZeroZeroSecond08ibmoslo = 1786
ZeroOneSecond08ibmoslo = 1753
OneZeroSecond08ibmoslo = 4298
OneOneSecond08ibmoslo = 355

```

```

ZeroZeroSecond10ibmoslo = 1956
ZeroOneSecond10ibmoslo = 1207
OneZeroSecond10ibmoslo = 4797
OneOneSecond10ibmoslo = 232

```

```
CosSqibmoslo =
```

```

{ {-1 *  $\pi$ , ZeroZeroSecond10ibmoslo / (OneZeroSecond10ibmoslo + ZeroZeroSecond10ibmoslo)},
  {-0.8 *  $\pi$ , ZeroZeroSecond08ibmoslo / (OneZeroSecond08ibmoslo + ZeroZeroSecond08ibmoslo)},
  {-0.6 *  $\pi$ , ZeroZeroSecond06ibmoslo / (OneZeroSecond06ibmoslo + ZeroZeroSecond06ibmoslo)},
  {-0.4 *  $\pi$ , ZeroZeroSecond04ibmoslo / (OneZeroSecond04ibmoslo + ZeroZeroSecond04ibmoslo)},
  {-0.2 *  $\pi$ , ZeroZeroSecond02ibmoslo / (OneZeroSecond02ibmoslo + ZeroZeroSecond02ibmoslo)},
  {0.0 *  $\pi$ , ZeroZeroFirst00ibmoslo / (OneZeroFirst00ibmoslo + ZeroZeroFirst00ibmoslo)},
  {0.2 *  $\pi$ , ZeroZeroFirst02ibmoslo / (OneZeroFirst02ibmoslo + ZeroZeroFirst02ibmoslo)},
  {0.4 *  $\pi$ , ZeroZeroFirst04ibmoslo / (OneZeroFirst04ibmoslo + ZeroZeroFirst04ibmoslo)},
  {0.6 *  $\pi$ , ZeroZeroFirst06ibmoslo / (OneZeroFirst06ibmoslo + ZeroZeroFirst06ibmoslo)},
  {0.8 *  $\pi$ , ZeroZeroFirst08ibmoslo / (OneZeroFirst08ibmoslo + ZeroZeroFirst08ibmoslo)},
  {1 *  $\pi$ , ZeroZeroFirst10ibmoslo / (OneZeroFirst10ibmoslo + ZeroZeroFirst10ibmoslo)} }
Decisivenessibmoslo = { {-1 *  $\pi$ , (OneZeroSecond10ibmoslo + ZeroZeroSecond10ibmoslo) / 8192},
  {-0.8 *  $\pi$ , (OneZeroSecond08ibmoslo + ZeroZeroSecond08ibmoslo) / 8192},
  {-0.6 *  $\pi$ , (OneZeroSecond06ibmoslo + ZeroZeroSecond06ibmoslo) / 8192},
  {-0.4 *  $\pi$ , (OneZeroSecond04ibmoslo + ZeroZeroSecond04ibmoslo) / 8192},
  {-0.2 *  $\pi$ , (OneZeroSecond02ibmoslo + ZeroZeroSecond02ibmoslo) / 8192},
  {-0.0 *  $\pi$ , (OneZeroFirst00ibmoslo + ZeroZeroFirst00ibmoslo) / 8192},
  {0.2 *  $\pi$ , (OneZeroFirst02ibmoslo + ZeroZeroFirst02ibmoslo) / 8192},
  {0.4 *  $\pi$ , (OneZeroFirst04ibmoslo + ZeroZeroFirst04ibmoslo) / 8192},
  {0.6 *  $\pi$ , (OneZeroFirst06ibmoslo + ZeroZeroFirst06ibmoslo) / 8192},
  {0.8 *  $\pi$ , (OneZeroFirst08ibmoslo + ZeroZeroFirst08ibmoslo) / 8192},
  {1.0 *  $\pi$ , (OneZeroFirst10ibmoslo + ZeroZeroFirst10ibmoslo) / 8192} }

```

```
ExpCosSqibmoslo = ListPlot[CosSqibmoslo]
```

```
ExpDecisivenessibmoslo = ListPlot[Decisivenessibmoslo]
```

```
Out[ ]= 1956
```

```
Out[ ]= 1207
```

$Out[ \ast ] = 4797$

$Out[ \ast ] = 232$

$Out[ \ast ] = 1939$

$Out[ \ast ] = 1506$

$Out[ \ast ] = 4413$

$Out[ \ast ] = 334$

$Out[ \ast ] = 1514$

$Out[ \ast ] = 2620$

$Out[ \ast ] = 3450$

$Out[ \ast ] = 608$

$Out[ \ast ] = 1060$

$Out[ \ast ] = 3960$

$Out[ \ast ] = 2138$

$Out[ \ast ] = 1034$

$Out[ \ast ] = 710$

$Out[ \ast ] = 5182$

$Out[ \ast ] = 1055$

$Out[ \ast ] = 1245$

$Out[ \ast ] = 570$

$Out[ \ast ] = 5547$

$Out[ \ast ] = 664$

$Out[ \ast ] = 1411$

$Out[ \ast ] = 672$

$Out[ \ast ] = 5144$

$Out[ \ast ] = 1098$

$Out[ \ast ] = 1278$

$Out[ \ast ] = 994$

$Out[ \ast ] = 4135$

$Out[ \ast ] = 2062$

$Out[ \ast ] = 1001$

$Out[ \ast ] = 1444$

Out[ ]= 2852

Out[ ]= 3243

Out[ ]= 653

Out[ ]= 1786

Out[ ]= 1753

Out[ ]= 4298

Out[ ]= 355

Out[ ]= 1956

Out[ ]= 1207

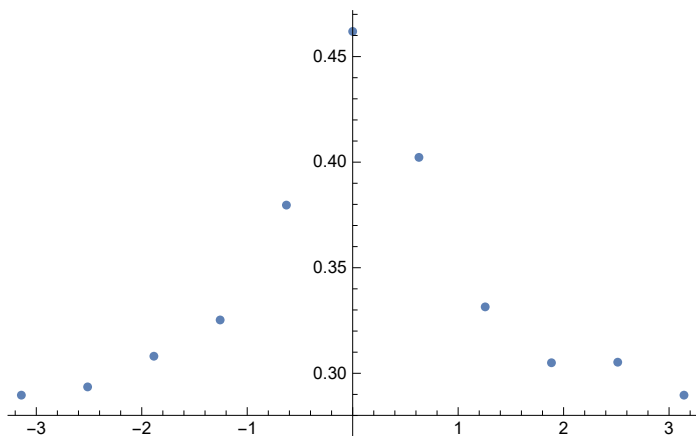
Out[ ]= 4797

Out[ ]= 232

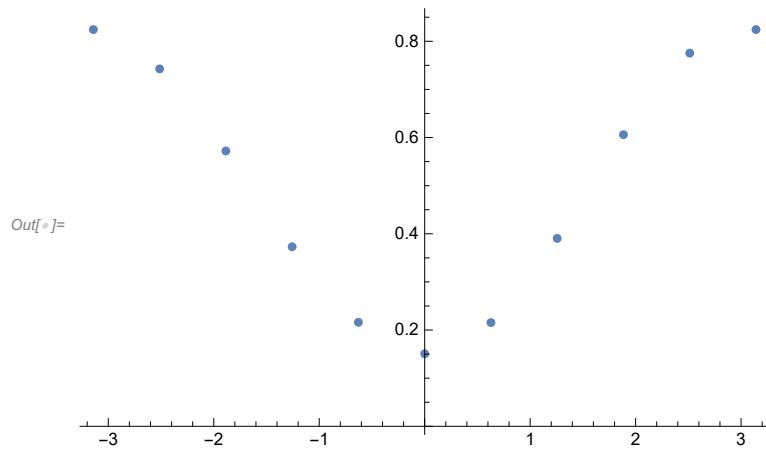
Out[ ]=  $\left\{ \left\{ -\pi, \frac{652}{2251} \right\}, \left\{ -2.51327, \frac{893}{3042} \right\}, \left\{ -1.88496, \frac{1444}{4687} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{497}{1528} \right\}, \left\{ -0.628319, \frac{112}{295} \right\}, \left\{ 0., \frac{285}{617} \right\}, \left\{ 0.628319, \frac{142}{353} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{530}{1599} \right\}, \left\{ 1.88496, \frac{757}{2482} \right\}, \left\{ 2.51327, \frac{1939}{6352} \right\}, \left\{ \pi, \frac{652}{2251} \right\} \right\}$

Out[ ]=  $\left\{ \left\{ -\pi, \frac{6753}{8192} \right\}, \left\{ -2.51327, \frac{1521}{2048} \right\}, \left\{ -1.88496, \frac{4687}{8192} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{191}{512} \right\}, \left\{ -0.628319, \frac{885}{4096} \right\}, \left\{ 0., \frac{617}{4096} \right\}, \left\{ 0.628319, \frac{1765}{8192} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{1599}{4096} \right\}, \left\{ 1.88496, \frac{1241}{2048} \right\}, \left\{ 2.51327, \frac{397}{512} \right\}, \left\{ 3.14159, \frac{6753}{8192} \right\} \right\}$

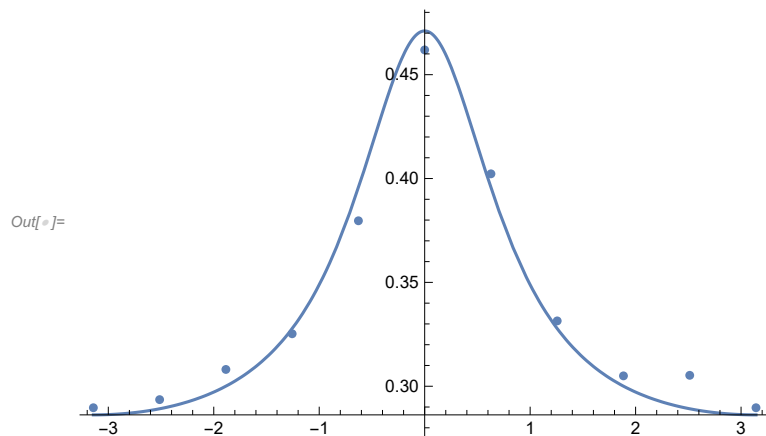
Out[ ]=



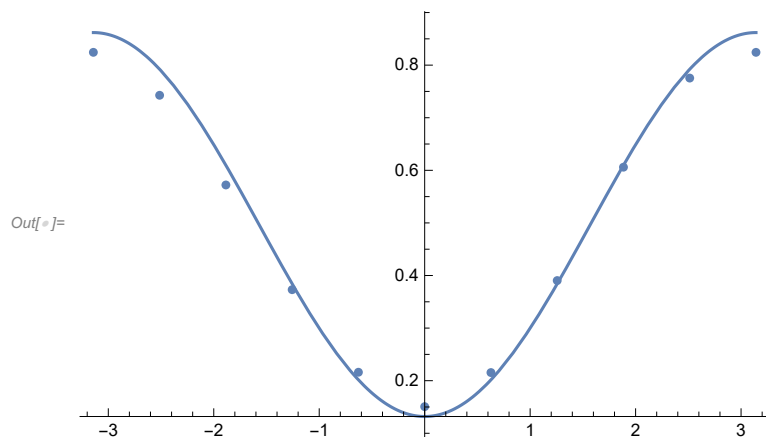




In[ ]:= **Show[costH, ExpCosSqibmoslo, PlotRange → All]**



In[ ]:= **Show[decTH, ExpDecisivenessibmoslo]**



In[ ]:= **(\*ibmq\_manila\*)**  
**ZeroZeroFirst10ibmqmanila = 2134**  
**ZeroOneFirst10ibmqmanila = 1132**  
**OneZeroFirst10ibmqmanila = 4776**  
**OneOneFirst10ibmqmanila = 150**  
  
**ZeroZeroFirst08ibmqmanila = 2005**

ZeroOneFirst08ibmqmanila = 1427  
 OneZeroFirst08ibmqmanila = 4489  
 OneOneFirst08ibmqmanila = 271

ZeroZeroFirst06ibmqmanila = 1691  
 ZeroOneFirst06ibmqmanila = 2670  
 OneZeroFirst06ibmqmanila = 3236  
 OneOneFirst06ibmqmanila = 595

ZeroZeroFirst04ibmqmanila = 1103  
 ZeroOneFirst04ibmqmanila = 4318  
 OneZeroFirst04ibmqmanila = 1900  
 OneOneFirst04ibmqmanila = 871

ZeroZeroFirst02ibmqmanila = 779  
 ZeroOneFirst02ibmqmanila = 5404  
 OneZeroFirst02ibmqmanila = 931  
 OneOneFirst02ibmqmanila = 1078

ZeroZeroFirst00ibmqmanila = 611  
 ZeroOneFirst00ibmqmanila = 5602  
 OneZeroFirst00ibmqmanila = 613  
 OneOneFirst00ibmqmanila = 1366

ZeroZeroSecond02ibmqmanila = 847  
 ZeroOneSecond02ibmqmanila = 5034  
 OneZeroSecond02ibmqmanila = 1050  
 OneOneSecond02ibmqmanila = 1261

ZeroZeroSecond04ibmqmanila = 1225  
 ZeroOneSecond04ibmqmanila = 3861  
 OneZeroSecond04ibmqmanila = 2144  
 OneOneSecond04ibmqmanila = 962

ZeroZeroSecond06ibmqmanila = 1693  
 ZeroOneSecond06ibmqmanila = 2569  
 OneZeroSecond06ibmqmanila = 3318  
 OneOneSecond06ibmqmanila = 612

ZeroZeroSecond08ibmqmanila = 2022  
 ZeroOneSecond08ibmqmanila = 1673  
 OneZeroSecond08ibmqmanila = 4228  
 OneOneSecond08ibmqmanila = 269

ZeroZeroSecond10ibmqmanila = 2134  
 ZeroOneSecond10ibmqmanila = 1132  
 OneZeroSecond10ibmqmanila = 4776  
 OneOneSecond10ibmqmanila = 150

$\text{CosSqibmqmanila} = \left\{ \left\{ -1 * \pi, \right. \right.$   
 $\left. \left. \text{ZeroZeroSecond10ibmqmanila} / \left( \text{OneZeroSecond10ibmqmanila} + \text{ZeroZeroSecond10ibmqmanila} \right) \right\} \right\},$

```

{-0.8 *  $\pi$ , ZeroZeroSecond08ibmqmanila /
  (OneZeroSecond08ibmqmanila + ZeroZeroSecond08ibmqmanila)}, {-0.6 *  $\pi$ ,
  ZeroZeroSecond06ibmqmanila / (OneZeroSecond06ibmqmanila + ZeroZeroSecond06ibmqmanila)},
{-0.4 *  $\pi$ , ZeroZeroSecond04ibmqmanila /
  (OneZeroSecond04ibmqmanila + ZeroZeroSecond04ibmqmanila)}, {-0.2 *  $\pi$ ,
  ZeroZeroSecond02ibmqmanila / (OneZeroSecond02ibmqmanila + ZeroZeroSecond02ibmqmanila)},
{0.0 *  $\pi$ , ZeroZeroFirst00ibmqmanila /
  (OneZeroFirst00ibmqmanila + ZeroZeroFirst00ibmqmanila)}, {0.2 *  $\pi$ ,
  ZeroZeroFirst02ibmqmanila / (OneZeroFirst02ibmqmanila + ZeroZeroFirst02ibmqmanila)},
{0.4 *  $\pi$ , ZeroZeroFirst04ibmqmanila /
  (OneZeroFirst04ibmqmanila + ZeroZeroFirst04ibmqmanila)}, {0.6 *  $\pi$ ,
  ZeroZeroFirst06ibmqmanila / (OneZeroFirst06ibmqmanila + ZeroZeroFirst06ibmqmanila)},
{0.8 *  $\pi$ , ZeroZeroFirst08ibmqmanila /
  (OneZeroFirst08ibmqmanila + ZeroZeroFirst08ibmqmanila)}, {1 *  $\pi$ ,
  ZeroZeroFirst10ibmqmanila / (OneZeroFirst10ibmqmanila + ZeroZeroFirst10ibmqmanila)}}
Decisivenessibmqmanila = {{-1 *  $\pi$ , (OneZeroSecond10ibmqmanila + ZeroZeroSecond10ibmqmanila) /
  8192}, {-0.8 *  $\pi$ , (OneZeroSecond08ibmqmanila + ZeroZeroSecond08ibmqmanila) / 8192},
{-0.6 *  $\pi$ , (OneZeroSecond06ibmqmanila + ZeroZeroSecond06ibmqmanila) / 8192},
{-0.4 *  $\pi$ , (OneZeroSecond04ibmqmanila + ZeroZeroSecond04ibmqmanila) / 8192},
{-0.2 *  $\pi$ , (OneZeroSecond02ibmqmanila + ZeroZeroSecond02ibmqmanila) / 8192},
{-0.0 *  $\pi$ , (OneZeroFirst00ibmqmanila + ZeroZeroFirst00ibmqmanila) / 8192},
{0.2 *  $\pi$ , (OneZeroFirst02ibmqmanila + ZeroZeroFirst02ibmqmanila) / 8192},
{0.4 *  $\pi$ , (OneZeroFirst04ibmqmanila + ZeroZeroFirst04ibmqmanila) / 8192},
{0.6 *  $\pi$ , (OneZeroFirst06ibmqmanila + ZeroZeroFirst06ibmqmanila) / 8192},
{0.8 *  $\pi$ , (OneZeroFirst08ibmqmanila + ZeroZeroFirst08ibmqmanila) / 8192},
{1.0 *  $\pi$ , (OneZeroFirst10ibmqmanila + ZeroZeroFirst10ibmqmanila) / 8192}}
ExpCosSqibmqmanila = ListPlot[CosSqibmqmanila]
ExpDecisivenessibmqmanila = ListPlot[Decisivenessibmqmanila]

```

Out[ ]= 2134

Out[ ]= 1132

Out[ ]= 4776

Out[ ]= 150

Out[ ]= 2005

Out[ ]= 1427

Out[ ]= 4489

Out[ ]= 271

Out[ ]= 1691

Out[ ]= 2670

Out[ ]= 3236

Out[ ]= 595

Out[ ]= 1103

Out[ ]= 4318

Out[ ]= 1900

Out[ ]= 871

Out[ ]= 779

Out[ ]= 5404

Out[ ]= 931

Out[ ]= 1078

Out[ ]= 611

Out[ ]= 5602

Out[ ]= 613

Out[ ]= 1366

Out[ ]= 847

Out[ ]= 5034

Out[ ]= 1050

Out[ ]= 1261

Out[ ]= 1225

Out[ ]= 3861

Out[ ]= 2144

Out[ ]= 962

Out[ ]= 1693

Out[ ]= 2569

Out[ ]= 3318

Out[ ]= 612

Out[ ]= 2022

Out[ ]= 1673

Out[ ]= 4228

Out[ ]= 269

Out[ ]= 2134

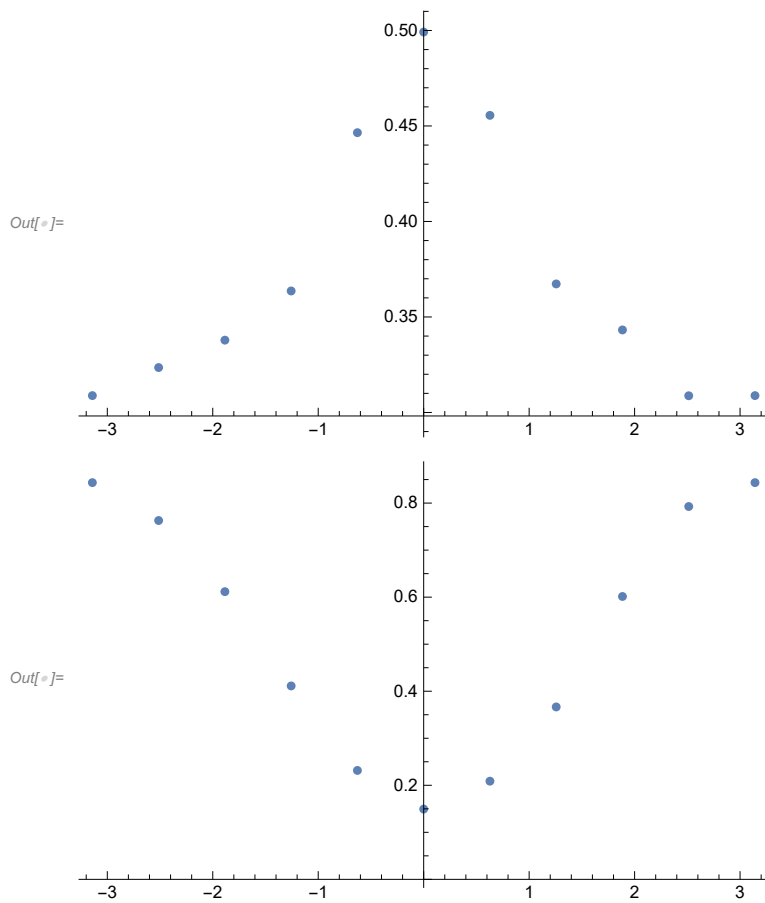
Out[ ]= 1132

Out[ ]= 4776

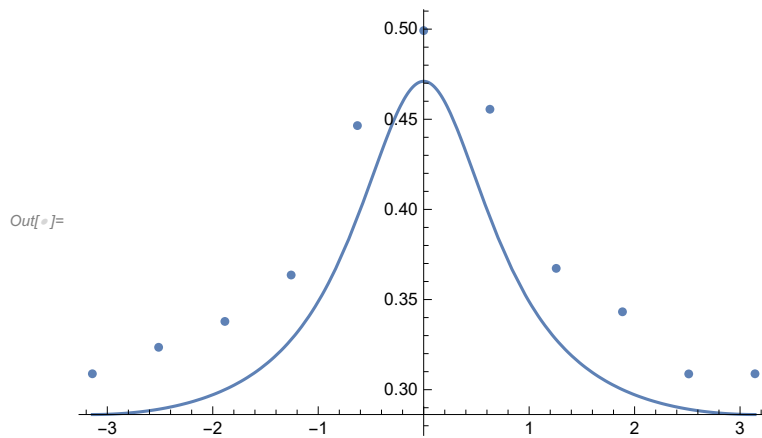
Out[ ]= 150

$$\text{Out[ ]} = \left\{ \left\{ -\pi, \frac{1067}{3455} \right\}, \left\{ -2.51327, \frac{1011}{3125} \right\}, \left\{ -1.88496, \frac{1693}{5011} \right\}, \right. \\ \left. \left\{ -1.25664, \frac{1225}{3369} \right\}, \left\{ -0.628319, \frac{121}{271} \right\}, \left\{ 0., \frac{611}{1224} \right\}, \left\{ 0.628319, \frac{41}{90} \right\}, \right. \\ \left. \left\{ 1.25664, \frac{1103}{3003} \right\}, \left\{ 1.88496, \frac{1691}{4927} \right\}, \left\{ 2.51327, \frac{2005}{6494} \right\}, \left\{ \pi, \frac{1067}{3455} \right\} \right\}$$

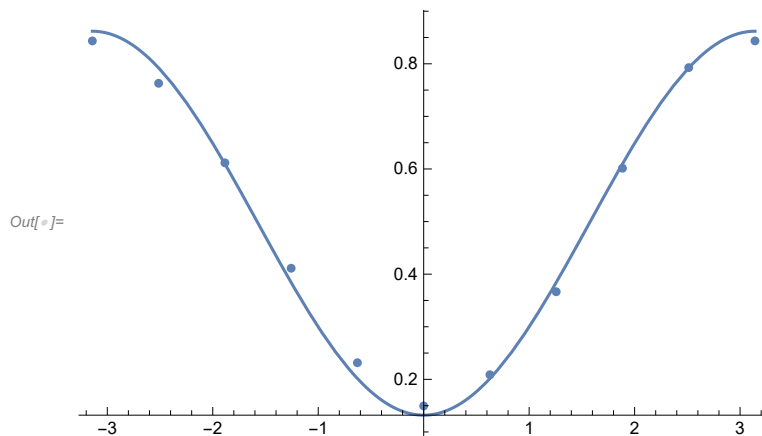
$$\text{Out[ ]} = \left\{ \left\{ -\pi, \frac{3455}{4096} \right\}, \left\{ -2.51327, \frac{3125}{4096} \right\}, \left\{ -1.88496, \frac{5011}{8192} \right\}, \right. \\ \left. \left\{ -1.25664, \frac{3369}{8192} \right\}, \left\{ -0.628319, \frac{1897}{8192} \right\}, \left\{ 0., \frac{153}{1024} \right\}, \left\{ 0.628319, \frac{855}{4096} \right\}, \right. \\ \left. \left\{ 1.25664, \frac{3003}{8192} \right\}, \left\{ 1.88496, \frac{4927}{8192} \right\}, \left\{ 2.51327, \frac{3247}{4096} \right\}, \left\{ 3.14159, \frac{3455}{4096} \right\} \right\}$$



```
In[ ]:= Show[cosTH, ExpCosSqibmqmanila, PlotRange -> All]
```



```
In[ ]:= Show[decTH, ExpDecisivenessibmqmanila, PlotRange -> All]
```



```
In[ ]:= (*ibmq_quito*)
```

```
ZeroZeroFirst10ibmqquito = 2121
ZeroOneFirst10ibmqquito = 823
OneZeroFirst10ibmqquito = 4996
OneOneFirst10ibmqquito = 252
```

```
ZeroZeroFirst08ibmqquito = 1992
ZeroOneFirst08ibmqquito = 1117
OneZeroFirst08ibmqquito = 4666
OneOneFirst08ibmqquito = 417
```

```
ZeroZeroFirst06ibmqquito = 1699
ZeroOneFirst06ibmqquito = 2096
OneZeroFirst06ibmqquito = 3561
OneOneFirst06ibmqquito = 836
```

```
ZeroZeroFirst04ibmqquito = 1252
ZeroOneFirst04ibmqquito = 3415
OneZeroFirst04ibmqquito = 2199
OneOneFirst04ibmqquito = 1326
```

ZeroZeroFirst02ibmqquito = 1005  
 ZeroOneFirst02ibmqquito = 4635  
 OneZeroFirst02ibmqquito = 1058  
 OneOneFirst02ibmqquito = 1494

ZeroZeroFirst00ibmqquito = 1051  
 ZeroOneFirst00ibmqquito = 4978  
 OneZeroFirst00ibmqquito = 644  
 OneOneFirst00ibmqquito = 1519

ZeroZeroSecond02ibmqquito = 1211  
 ZeroOneSecond02ibmqquito = 4870  
 OneZeroSecond02ibmqquito = 688  
 OneOneSecond02ibmqquito = 1423

ZeroZeroSecond04ibmqquito = 1550  
 ZeroOneSecond04ibmqquito = 3959  
 OneZeroSecond04ibmqquito = 1486  
 OneOneSecond04ibmqquito = 1197

ZeroZeroSecond06ibmqquito = 1927  
 ZeroOneSecond06ibmqquito = 2644  
 OneZeroSecond06ibmqquito = 2920  
 OneOneSecond06ibmqquito = 701

ZeroZeroSecond08ibmqquito = 2083  
 ZeroOneSecond08ibmqquito = 1477  
 OneZeroSecond08ibmqquito = 4219  
 OneOneSecond08ibmqquito = 413

ZeroZeroSecond10ibmqquito = 2121  
 ZeroOneSecond10ibmqquito = 823  
 OneZeroSecond10ibmqquito = 4996  
 OneOneSecond10ibmqquito = 252

CosSqibmqquito =  $\{ \{-1 * \pi,$   
 $\text{ZeroZeroSecond10ibmqquito} / (\text{OneZeroSecond10ibmqquito} + \text{ZeroZeroSecond10ibmqquito}) \},$   
 $\{-0.8 * \pi, \text{ZeroZeroSecond08ibmqquito} /$   
 $(\text{OneZeroSecond08ibmqquito} + \text{ZeroZeroSecond08ibmqquito}) \}, \{-0.6 * \pi,$   
 $\text{ZeroZeroSecond06ibmqquito} / (\text{OneZeroSecond06ibmqquito} + \text{ZeroZeroSecond06ibmqquito}) \},$   
 $\{-0.4 * \pi, \text{ZeroZeroSecond04ibmqquito} /$   
 $(\text{OneZeroSecond04ibmqquito} + \text{ZeroZeroSecond04ibmqquito}) \}, \{-0.2 * \pi,$   
 $\text{ZeroZeroSecond02ibmqquito} / (\text{OneZeroSecond02ibmqquito} + \text{ZeroZeroSecond02ibmqquito}) \},$   
 $\{0.0 * \pi, \text{ZeroZeroFirst00ibmqquito} / (\text{OneZeroFirst00ibmqquito} + \text{ZeroZeroFirst00ibmqquito}) \},$   
 $\{0.2 * \pi, \text{ZeroZeroFirst02ibmqquito} / (\text{OneZeroFirst02ibmqquito} + \text{ZeroZeroFirst02ibmqquito}) \},$   
 $\{0.4 * \pi, \text{ZeroZeroFirst04ibmqquito} / (\text{OneZeroFirst04ibmqquito} + \text{ZeroZeroFirst04ibmqquito}) \},$   
 $\{0.6 * \pi, \text{ZeroZeroFirst06ibmqquito} / (\text{OneZeroFirst06ibmqquito} + \text{ZeroZeroFirst06ibmqquito}) \},$   
 $\{0.8 * \pi, \text{ZeroZeroFirst08ibmqquito} / (\text{OneZeroFirst08ibmqquito} + \text{ZeroZeroFirst08ibmqquito}) \},$   
 $\{1 * \pi, \text{ZeroZeroFirst10ibmqquito} / (\text{OneZeroFirst10ibmqquito} + \text{ZeroZeroFirst10ibmqquito}) \} \}$   
 Decisivenessibmqquito =

```
{ {-1 *  $\pi$ , (OneZeroSecond10ibmqquito + ZeroZeroSecond10ibmqquito) / 8192},
  {-0.8 *  $\pi$ , (OneZeroSecond08ibmqquito + ZeroZeroSecond08ibmqquito) / 8192},
  {-0.6 *  $\pi$ , (OneZeroSecond06ibmqquito + ZeroZeroSecond06ibmqquito) / 8192},
  {-0.4 *  $\pi$ , (OneZeroSecond04ibmqquito + ZeroZeroSecond04ibmqquito) / 8192},
  {-0.2 *  $\pi$ , (OneZeroSecond02ibmqquito + ZeroZeroSecond02ibmqquito) / 8192},
  {-0.0 *  $\pi$ , (OneZeroFirst00ibmqquito + ZeroZeroFirst00ibmqquito) / 8192},
  {0.2 *  $\pi$ , (OneZeroFirst02ibmqquito + ZeroZeroFirst02ibmqquito) / 8192},
  {0.4 *  $\pi$ , (OneZeroFirst04ibmqquito + ZeroZeroFirst04ibmqquito) / 8192},
  {0.6 *  $\pi$ , (OneZeroFirst06ibmqquito + ZeroZeroFirst06ibmqquito) / 8192},
  {0.8 *  $\pi$ , (OneZeroFirst08ibmqquito + ZeroZeroFirst08ibmqquito) / 8192},
  {1.0 *  $\pi$ , (OneZeroFirst10ibmqquito + ZeroZeroFirst10ibmqquito) / 8192}}
```

```
ExpCosSqibmqquito = ListPlot[CosSqibmqquito]
```

```
ExpDecisivenessibmqquito = ListPlot[Decisivenessibmqquito]
```

```
Out[ ]= 2121
```

```
Out[ ]= 823
```

```
Out[ ]= 4996
```

```
Out[ ]= 252
```

```
Out[ ]= 1992
```

```
Out[ ]= 1117
```

```
Out[ ]= 4666
```

```
Out[ ]= 417
```

```
Out[ ]= 1699
```

```
Out[ ]= 2096
```

```
Out[ ]= 3561
```

```
Out[ ]= 836
```

```
Out[ ]= 1252
```

```
Out[ ]= 3415
```

```
Out[ ]= 2199
```

```
Out[ ]= 1326
```

```
Out[ ]= 1005
```

```
Out[ ]= 4635
```

```
Out[ ]= 1058
```

```
Out[ ]= 1494
```

```
Out[ ]= 1051
```

```
Out[ ]= 4978
```



$$\text{Out}[*]= 644$$

$$\text{Out}[*]= 1519$$

$$\text{Out}[*]= 1211$$

$$\text{Out}[*]= 4870$$

$$\text{Out}[*]= 688$$

$$\text{Out}[*]= 1423$$

$$\text{Out}[*]= 1550$$

$$\text{Out}[*]= 3959$$

$$\text{Out}[*]= 1486$$

$$\text{Out}[*]= 1197$$

$$\text{Out}[*]= 1927$$

$$\text{Out}[*]= 2644$$

$$\text{Out}[*]= 2920$$

$$\text{Out}[*]= 701$$

$$\text{Out}[*]= 2083$$

$$\text{Out}[*]= 1477$$

$$\text{Out}[*]= 4219$$

$$\text{Out}[*]= 413$$

$$\text{Out}[*]= 2121$$

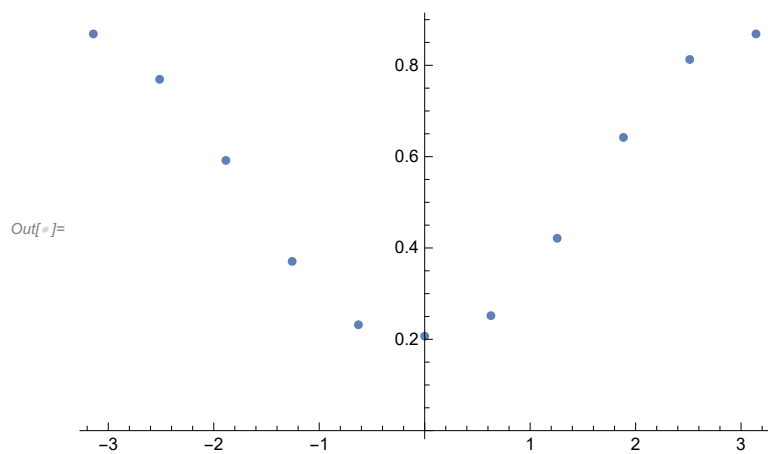
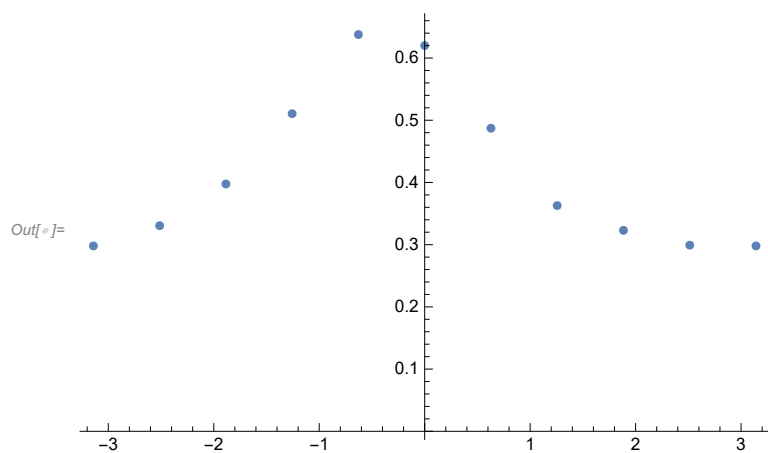
$$\text{Out}[*]= 823$$

$$\text{Out}[*]= 4996$$

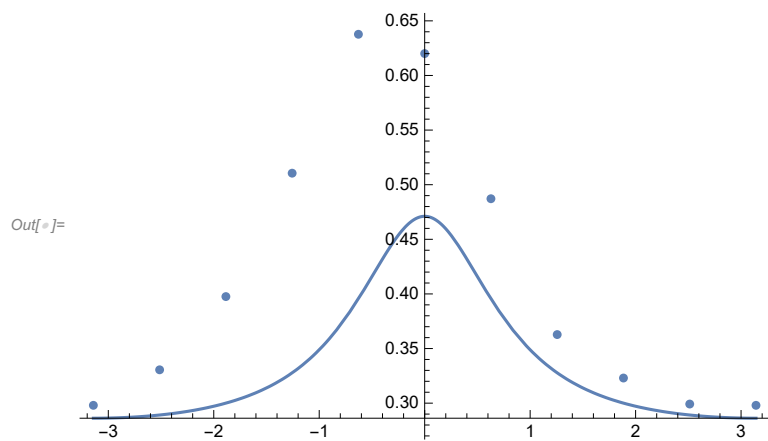
$$\text{Out}[*]= 252$$

$$\begin{aligned} \text{Out}[*]= & \left\{ \left\{ -\pi, \frac{2121}{7117} \right\}, \left\{ -2.51327, \frac{2083}{6302} \right\}, \left\{ -1.88496, \frac{1927}{4847} \right\}, \right. \\ & \left\{ -1.25664, \frac{775}{1518} \right\}, \left\{ -0.628319, \frac{1211}{1899} \right\}, \left\{ 0., \frac{1051}{1695} \right\}, \left\{ 0.628319, \frac{1005}{2063} \right\}, \\ & \left. \left\{ 1.25664, \frac{1252}{3451} \right\}, \left\{ 1.88496, \frac{1699}{5260} \right\}, \left\{ 2.51327, \frac{996}{3329} \right\}, \left\{ \pi, \frac{2121}{7117} \right\} \right\} \end{aligned}$$

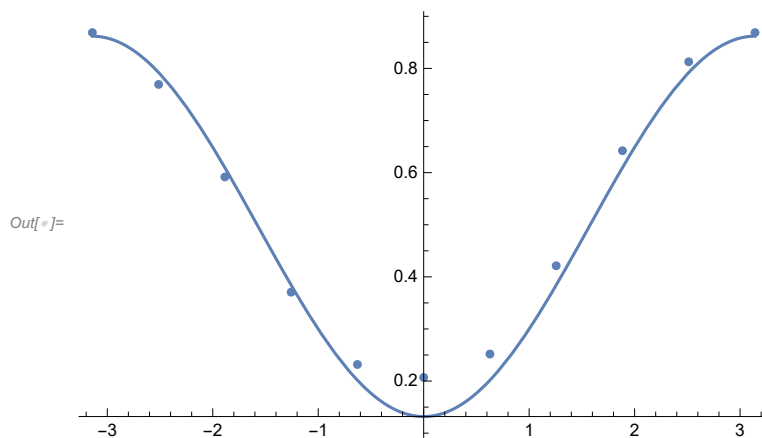
$$\begin{aligned} \text{Out}[*]= & \left\{ \left\{ -\pi, \frac{7117}{8192} \right\}, \left\{ -2.51327, \frac{3151}{4096} \right\}, \left\{ -1.88496, \frac{4847}{8192} \right\}, \right. \\ & \left\{ -1.25664, \frac{759}{2048} \right\}, \left\{ -0.628319, \frac{1899}{8192} \right\}, \left\{ 0., \frac{1695}{8192} \right\}, \left\{ 0.628319, \frac{2063}{8192} \right\}, \\ & \left. \left\{ 1.25664, \frac{3451}{8192} \right\}, \left\{ 1.88496, \frac{1315}{2048} \right\}, \left\{ 2.51327, \frac{3329}{4096} \right\}, \left\{ 3.14159, \frac{7117}{8192} \right\} \right\} \end{aligned}$$



In[ ]:= **Show[cosTH, ExpCosSqibmqquito, PlotRange → All]**



In[ ]:= Show[decTH, ExpDecisivenessibmqquito, PlotRange → All]



In[ ]:= (\*ibmq\_lima\*)

ZeroZeroFirst10ibmqlima = 2413

ZeroOneFirst10ibmqlima = 888

OneZeroFirst10ibmqlima = 4658

OneOneFirst10ibmqlima = 233

ZeroZeroFirst08ibmqlima = 2232

ZeroOneFirst08ibmqlima = 1355

OneZeroFirst08ibmqlima = 4404

OneOneFirst08ibmqlima = 201

ZeroZeroFirst06ibmqlima = 1937

ZeroOneFirst06ibmqlima = 2394

OneZeroFirst06ibmqlima = 3402

OneOneFirst06ibmqlima = 459

ZeroZeroFirst04ibmqlima = 1834

ZeroOneFirst04ibmqlima = 3403

OneZeroFirst04ibmqlima = 2205

OneOneFirst04ibmqlima = 750

ZeroZeroFirst02ibmqlima = 1503

ZeroOneFirst02ibmqlima = 4276

OneZeroFirst02ibmqlima = 1315

OneOneFirst02ibmqlima = 1098

ZeroZeroFirst00ibmqlima = 1342

ZeroOneFirst00ibmqlima = 4697

OneZeroFirst00ibmqlima = 946

OneOneFirst00ibmqlima = 1207

ZeroZeroSecond02ibmqlima = 1421

ZeroOneSecond02ibmqlima = 4407

OneZeroSecond02ibmqlima = 1276

OneOneSecond02ibmqlima = 1088

```

ZeroZeroSecond04ibmqLima = 1687
ZeroOneSecond04ibmqLima = 3491
OneZeroSecond04ibmqLima = 2106
OneOneSecond04ibmqLima = 908

```

```

ZeroZeroSecond06ibmqLima = 1871
ZeroOneSecond06ibmqLima = 2358
OneZeroSecond06ibmqLima = 3229
OneOneSecond06ibmqLima = 734

```

```

ZeroZeroSecond08ibmqLima = 2278
ZeroOneSecond08ibmqLima = 1275
OneZeroSecond08ibmqLima = 4230
OneOneSecond08ibmqLima = 409

```

```

ZeroZeroSecond10ibmqLima = 2413
ZeroOneSecond10ibmqLima = 888
OneZeroSecond10ibmqLima = 4658
OneOneSecond10ibmqLima = 233

```

```
CosSqibmqLima =
```

```

{{-1 *  $\pi$ , ZeroZeroSecond10ibmqLima / (OneZeroSecond10ibmqLima + ZeroZeroSecond10ibmqLima)},
{-0.8 *  $\pi$ , ZeroZeroSecond08ibmqLima /
  (OneZeroSecond08ibmqLima + ZeroZeroSecond08ibmqLima)}, {-0.6 *  $\pi$ ,
  ZeroZeroSecond06ibmqLima / (OneZeroSecond06ibmqLima + ZeroZeroSecond06ibmqLima)},
{-0.4 *  $\pi$ , ZeroZeroSecond04ibmqLima /
  (OneZeroSecond04ibmqLima + ZeroZeroSecond04ibmqLima)}, {-0.2 *  $\pi$ ,
  ZeroZeroSecond02ibmqLima / (OneZeroSecond02ibmqLima + ZeroZeroSecond02ibmqLima)},
{0.0 *  $\pi$ , ZeroZeroFirst00ibmqLima / (OneZeroFirst00ibmqLima + ZeroZeroFirst00ibmqLima)},
{0.2 *  $\pi$ , ZeroZeroFirst02ibmqLima / (OneZeroFirst02ibmqLima + ZeroZeroFirst02ibmqLima)},
{0.4 *  $\pi$ , ZeroZeroFirst04ibmqLima / (OneZeroFirst04ibmqLima + ZeroZeroFirst04ibmqLima)},
{0.6 *  $\pi$ , ZeroZeroFirst06ibmqLima / (OneZeroFirst06ibmqLima + ZeroZeroFirst06ibmqLima)},
{0.8 *  $\pi$ , ZeroZeroFirst08ibmqLima / (OneZeroFirst08ibmqLima + ZeroZeroFirst08ibmqLima)},
{1 *  $\pi$ , ZeroZeroFirst10ibmqLima / (OneZeroFirst10ibmqLima + ZeroZeroFirst10ibmqLima)}}

```

```
DecisivenessibmqLima =
```

```

{{-1 *  $\pi$ , (OneZeroSecond10ibmqLima + ZeroZeroSecond10ibmqLima) / 8192},
{-0.8 *  $\pi$ , (OneZeroSecond08ibmqLima + ZeroZeroSecond08ibmqLima) / 8192},
{-0.6 *  $\pi$ , (OneZeroSecond06ibmqLima + ZeroZeroSecond06ibmqLima) / 8192},
{-0.4 *  $\pi$ , (OneZeroSecond04ibmqLima + ZeroZeroSecond04ibmqLima) / 8192},
{-0.2 *  $\pi$ , (OneZeroSecond02ibmqLima + ZeroZeroSecond02ibmqLima) / 8192},
{-0.0 *  $\pi$ , (OneZeroFirst00ibmqLima + ZeroZeroFirst00ibmqLima) / 8192},
{0.2 *  $\pi$ , (OneZeroFirst02ibmqLima + ZeroZeroFirst02ibmqLima) / 8192},
{0.4 *  $\pi$ , (OneZeroFirst04ibmqLima + ZeroZeroFirst04ibmqLima) / 8192},
{0.6 *  $\pi$ , (OneZeroFirst06ibmqLima + ZeroZeroFirst06ibmqLima) / 8192},
{0.8 *  $\pi$ , (OneZeroFirst08ibmqLima + ZeroZeroFirst08ibmqLima) / 8192},
{1.0 *  $\pi$ , (OneZeroFirst10ibmqLima + ZeroZeroFirst10ibmqLima) / 8192}}

```

```
ExpCosSqibmqLima = ListPlot[CosSqibmqLima]
```

```
ExpDecisivenessibmqLima = ListPlot[DecisivenessibmqLima]
```

Out[ ]= 2413

Out[ ]= 888

Out[ ]= 4658

Out[ ]= 233

Out[ ]= 2232

Out[ ]= 1355

Out[ ]= 4404

Out[ ]= 201

Out[ ]= 1937

Out[ ]= 2394

Out[ ]= 3402

Out[ ]= 459

Out[ ]= 1834

Out[ ]= 3403

Out[ ]= 2205

Out[ ]= 750

Out[ ]= 1503

Out[ ]= 4276

Out[ ]= 1315

Out[ ]= 1098

Out[ ]= 1342

Out[ ]= 4697

Out[ ]= 946

Out[ ]= 1207

Out[ ]= 1421

Out[ ]= 4407

Out[ ]= 1276

Out[ ]= 1088

Out[ ]= 1687

Out[ ]= 3491

Out[ ]= 2106

Out[ ]= 908

Out[ ]= 1871

Out[ ]= 2358

Out[ ]= 3229

Out[ ]= 734

Out[ ]= 2278

Out[ ]= 1275

Out[ ]= 4230

Out[ ]= 409

Out[ ]= 2413

Out[ ]= 888

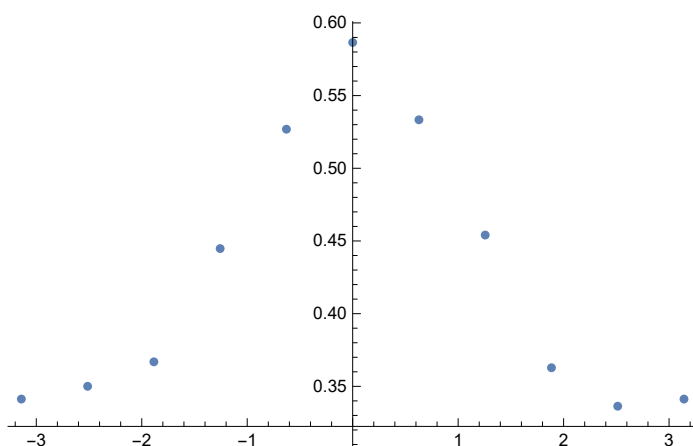
Out[ ]= 4658

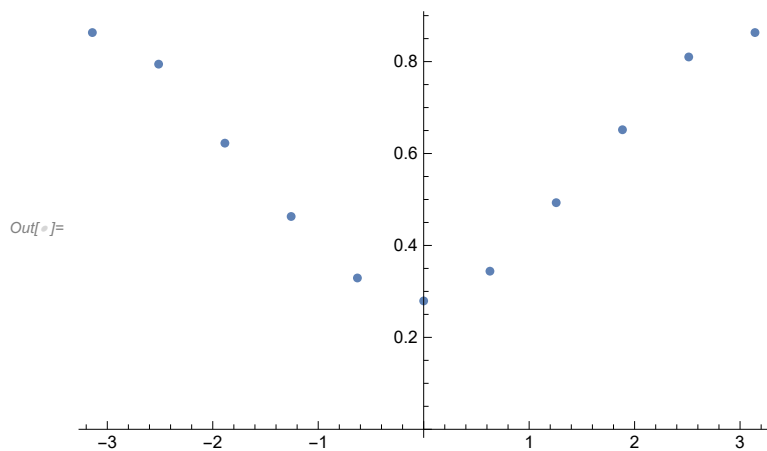
Out[ ]= 233

Out[ ]=  $\left\{ \left\{ -\pi, \frac{2413}{7071} \right\}, \left\{ -2.51327, \frac{1139}{3254} \right\}, \left\{ -1.88496, \frac{1871}{5100} \right\}, \left\{ -1.25664, \frac{1687}{3793} \right\}, \left\{ -0.628319, \frac{49}{93} \right\}, \right.$   
 $\left. \left\{ 0., \frac{61}{104} \right\}, \left\{ 0.628319, \frac{1503}{2818} \right\}, \left\{ 1.25664, \frac{262}{577} \right\}, \left\{ 1.88496, \frac{1937}{5339} \right\}, \left\{ 2.51327, \frac{186}{553} \right\}, \left\{ \pi, \frac{2413}{7071} \right\} \right\}$

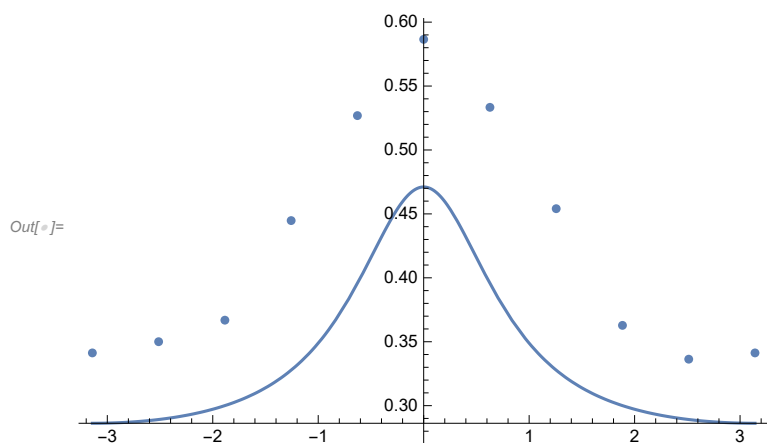
Out[ ]=  $\left\{ \left\{ -\pi, \frac{7071}{8192} \right\}, \left\{ -2.51327, \frac{1627}{2048} \right\}, \left\{ -1.88496, \frac{1275}{2048} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{3793}{8192} \right\}, \left\{ -0.628319, \frac{2697}{8192} \right\}, \left\{ 0., \frac{143}{512} \right\}, \left\{ 0.628319, \frac{1409}{4096} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{4039}{8192} \right\}, \left\{ 1.88496, \frac{5339}{8192} \right\}, \left\{ 2.51327, \frac{1659}{2048} \right\}, \left\{ 3.14159, \frac{7071}{8192} \right\} \right\}$

Out[ ]=

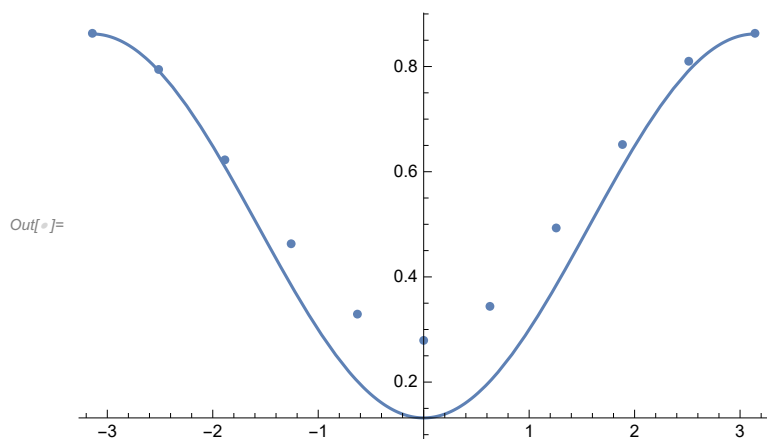




In[ ]:= Show[cosTH, ExpCosSqibmqqlima, PlotRange → All]



In[ ]:= Show[decTH, ExpDecisivenessibmqqlima]



In[ ]:= (\*ibmq\_qasm\_simulator\*)  
 ZeroZeroFirst10ibmqqasmsimulator = 2091  
 ZeroOneFirst10ibmqqasmsimulator = 1075  
 OneZeroFirst10ibmqqasmsimulator = 5011  
 OneOneFirst10ibmqqasmsimulator = 15

ZeroZeroFirst08ibmqqasmsimulator = 1830

```

ZeroOneFirst08ibmqqasmsimulator = 1513
OneZeroFirst08ibmqqasmsimulator = 4689
OneOneFirst08ibmqqasmsimulator = 160

```

```

ZeroZeroFirst06ibmqqasmsimulator = 1545
ZeroOneFirst06ibmqqasmsimulator = 2709
OneZeroFirst06ibmqqasmsimulator = 3433
OneOneFirst06ibmqqasmsimulator = 505

```

```

ZeroZeroFirst04ibmqqasmsimulator = 1043
ZeroOneFirst04ibmqqasmsimulator = 4038
OneZeroFirst04ibmqqasmsimulator = 2122
OneOneFirst04ibmqqasmsimulator = 989

```

```

ZeroZeroFirst02ibmqqasmsimulator = 687
ZeroOneFirst02ibmqqasmsimulator = 5199
OneZeroFirst02ibmqqasmsimulator = 976
OneOneFirst02ibmqqasmsimulator = 1330

```

```

ZeroZeroFirst00ibmqqasmsimulator = 541
ZeroOneFirst00ibmqqasmsimulator = 5586
OneZeroFirst00ibmqqasmsimulator = 544
OneOneFirst00ibmqqasmsimulator = 1521

```

```

ZeroZeroSecond02ibmqqasmsimulator = 649
ZeroOneSecond02ibmqqasmsimulator = 5210
OneZeroSecond02ibmqqasmsimulator = 982
OneOneSecond02ibmqqasmsimulator = 1351

```

```

ZeroZeroSecond04ibmqqasmsimulator = 1034
ZeroOneSecond04ibmqqasmsimulator = 4098
OneZeroSecond04ibmqqasmsimulator = 2111
OneOneSecond04ibmqqasmsimulator = 949

```

```

ZeroZeroSecond06ibmqqasmsimulator = 1464
ZeroOneSecond06ibmqqasmsimulator = 2669
OneZeroSecond06ibmqqasmsimulator = 3499
OneOneSecond06ibmqqasmsimulator = 560

```

```

ZeroZeroSecond08ibmqqasmsimulator = 1860
ZeroOneSecond08ibmqqasmsimulator = 1541
OneZeroSecond08ibmqqasmsimulator = 4616
OneOneSecond08ibmqqasmsimulator = 175

```

```

ZeroZeroSecond10ibmqqasmsimulator = 2091
ZeroOneSecond10ibmqqasmsimulator = 1075
OneZeroSecond10ibmqqasmsimulator = 5011
OneOneSecond10ibmqqasmsimulator = 15

```

```

CosSqibmqqasmsimulator = {{-1 *  $\pi$ , ZeroZeroSecond10ibmqqasmsimulator /
  (OneZeroSecond10ibmqqasmsimulator + ZeroZeroSecond10ibmqqasmsimulator)},

```



```

{-0.8 *  $\pi$ , ZeroZeroSecond08ibmqqasmsimulator /
  (OneZeroSecond08ibmqqasmsimulator + ZeroZeroSecond08ibmqqasmsimulator)},
{-0.6 *  $\pi$ , ZeroZeroSecond06ibmqqasmsimulator /
  (OneZeroSecond06ibmqqasmsimulator + ZeroZeroSecond06ibmqqasmsimulator)},
{-0.4 *  $\pi$ , ZeroZeroSecond04ibmqqasmsimulator /
  (OneZeroSecond04ibmqqasmsimulator + ZeroZeroSecond04ibmqqasmsimulator)},
{-0.2 *  $\pi$ , ZeroZeroSecond02ibmqqasmsimulator /
  (OneZeroSecond02ibmqqasmsimulator + ZeroZeroSecond02ibmqqasmsimulator)},
{0.0 *  $\pi$ , ZeroZeroFirst00ibmqqasmsimulator /
  (OneZeroFirst00ibmqqasmsimulator + ZeroZeroFirst00ibmqqasmsimulator)},
{0.2 *  $\pi$ , ZeroZeroFirst02ibmqqasmsimulator /
  (OneZeroFirst02ibmqqasmsimulator + ZeroZeroFirst02ibmqqasmsimulator)},
{0.4 *  $\pi$ , ZeroZeroFirst04ibmqqasmsimulator /
  (OneZeroFirst04ibmqqasmsimulator + ZeroZeroFirst04ibmqqasmsimulator)},
{0.6 *  $\pi$ , ZeroZeroFirst06ibmqqasmsimulator /
  (OneZeroFirst06ibmqqasmsimulator + ZeroZeroFirst06ibmqqasmsimulator)},
{0.8 *  $\pi$ , ZeroZeroFirst08ibmqqasmsimulator /
  (OneZeroFirst08ibmqqasmsimulator + ZeroZeroFirst08ibmqqasmsimulator)},
{1 *  $\pi$ , ZeroZeroFirst10ibmqqasmsimulator /
  (OneZeroFirst10ibmqqasmsimulator + ZeroZeroFirst10ibmqqasmsimulator)}}
Decisivenessibmqqasmsimulator = {{-1 *  $\pi$ ,
  (OneZeroSecond10ibmqqasmsimulator + ZeroZeroSecond10ibmqqasmsimulator) / 8192},
{-0.8 *  $\pi$ , (OneZeroSecond08ibmqqasmsimulator + ZeroZeroSecond08ibmqqasmsimulator) / 8192},
{-0.6 *  $\pi$ , (OneZeroSecond06ibmqqasmsimulator + ZeroZeroSecond06ibmqqasmsimulator) / 8192},
{-0.4 *  $\pi$ , (OneZeroSecond04ibmqqasmsimulator + ZeroZeroSecond04ibmqqasmsimulator) / 8192},
{-0.2 *  $\pi$ , (OneZeroSecond02ibmqqasmsimulator + ZeroZeroSecond02ibmqqasmsimulator) / 8192},
{-0.0 *  $\pi$ , (OneZeroFirst00ibmqqasmsimulator + ZeroZeroFirst00ibmqqasmsimulator) / 8192},
{0.2 *  $\pi$ , (OneZeroFirst02ibmqqasmsimulator + ZeroZeroFirst02ibmqqasmsimulator) / 8192},
{0.4 *  $\pi$ , (OneZeroFirst04ibmqqasmsimulator + ZeroZeroFirst04ibmqqasmsimulator) / 8192},
{0.6 *  $\pi$ , (OneZeroFirst06ibmqqasmsimulator + ZeroZeroFirst06ibmqqasmsimulator) / 8192},
{0.8 *  $\pi$ , (OneZeroFirst08ibmqqasmsimulator + ZeroZeroFirst08ibmqqasmsimulator) / 8192},
{1.0 *  $\pi$ , (OneZeroFirst10ibmqqasmsimulator + ZeroZeroFirst10ibmqqasmsimulator) / 8192}}
ExpCosSqibmqqasmsimulator = ListPlot[CosSqibmqqasmsimulator]
ExpDecisivenessibmqqasmsimulator = ListPlot[Decisivenessibmqqasmsimulator]

```

Out[ ]= 2091

Out[ ]= 1075

Out[ ]= 5011

Out[ ]= 15

Out[ ]= 1830

Out[ ]= 1513

Out[ ]= 4689

Out[ ]= 160

Out[ ]= 1545

Out[ ]= 2709

Out[ ]= 3433

Out[ ]= 505

Out[ ]= 1043

Out[ ]= 4038

Out[ ]= 2122

Out[ ]= 989

Out[ ]= 687

Out[ ]= 5199

Out[ ]= 976

Out[ ]= 1330

Out[ ]= 541

Out[ ]= 5586

Out[ ]= 544

Out[ ]= 1521

Out[ ]= 649

Out[ ]= 5210

Out[ ]= 982

Out[ ]= 1351

Out[ ]= 1034

Out[ ]= 4098

Out[ ]= 2111

Out[ ]= 949

Out[ ]= 1464

Out[ ]= 2669

Out[ ]= 3499

Out[ ]= 560

Out[ ]= 1860

Out[ ]= 1541

Out[ ]= 4616

Out[ ]= 175

Out[ ]= 2091

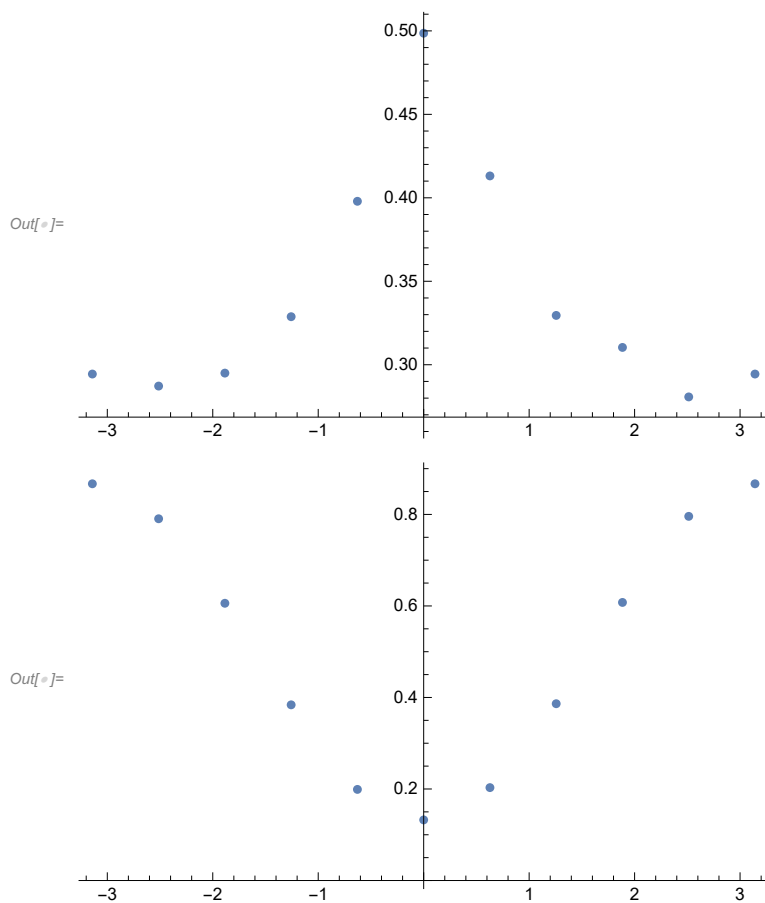
Out[ ]= 1075

Out[ ]= 5011

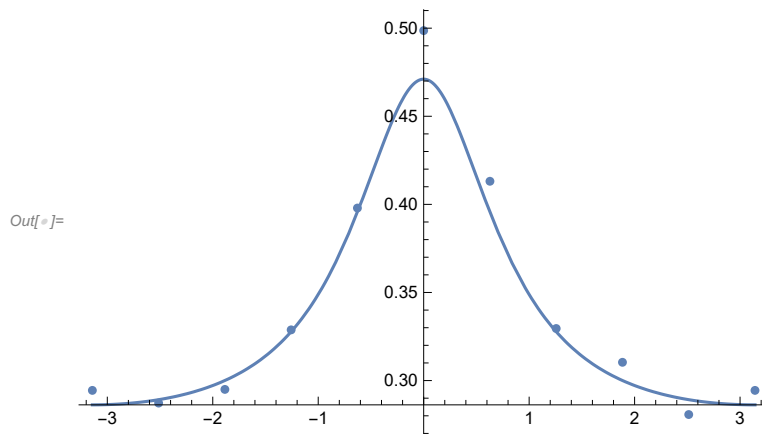
Out[ ]= 15

Out[ ]=  $\left\{ \left\{ -\pi, \frac{2091}{7102} \right\}, \left\{ -2.51327, \frac{465}{1619} \right\}, \left\{ -1.88496, \frac{1464}{4963} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{1034}{3145} \right\}, \left\{ -0.628319, \frac{649}{1631} \right\}, \left\{ 0., \frac{541}{1085} \right\}, \left\{ 0.628319, \frac{687}{1663} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{1043}{3165} \right\}, \left\{ 1.88496, \frac{1545}{4978} \right\}, \left\{ 2.51327, \frac{610}{2173} \right\}, \left\{ \pi, \frac{2091}{7102} \right\} \right\}$

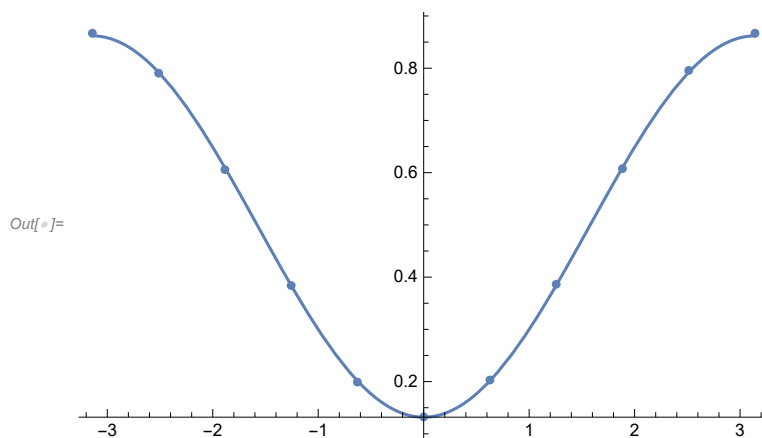
Out[ ]=  $\left\{ \left\{ -\pi, \frac{3551}{4096} \right\}, \left\{ -2.51327, \frac{1619}{2048} \right\}, \left\{ -1.88496, \frac{4963}{8192} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{3145}{8192} \right\}, \left\{ -0.628319, \frac{1631}{8192} \right\}, \left\{ 0., \frac{1085}{8192} \right\}, \left\{ 0.628319, \frac{1663}{8192} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{3165}{8192} \right\}, \left\{ 1.88496, \frac{2489}{4096} \right\}, \left\{ 2.51327, \frac{6519}{8192} \right\}, \left\{ 3.14159, \frac{3551}{4096} \right\} \right\}$



```
In[ ]:= Show[cosTH, ExpCosSqibmqqasmsimulator, PlotRange -> All]
```



```
In[ ]:= Show[decTH, ExpDecisivenessibmqqasmsimulator, PlotRange -> All]
```



```
In[ ]:= (*ibmq_belem*)
```

```
ZeroZeroFirst10ibmqbelem = 2407
```

```
ZeroOneFirst10ibmqbelem = 1320
```

```
OneZeroFirst10ibmqbelem = 4089
```

```
OneOneFirst10ibmqbelem = 376
```

```
ZeroZeroFirst08ibmqbelem = 2029
```

```
ZeroOneFirst08ibmqbelem = 1565
```

```
OneZeroFirst08ibmqbelem = 4096
```

```
OneOneFirst08ibmqbelem = 502
```

```
ZeroZeroFirst06ibmqbelem = 1619
```

```
ZeroOneFirst06ibmqbelem = 2388
```

```
OneZeroFirst06ibmqbelem = 3367
```

```
OneOneFirst06ibmqbelem = 818
```

```
ZeroZeroFirst04ibmqbelem = 1138
```

```
ZeroOneFirst04ibmqbelem = 3460
```

```
OneZeroFirst04ibmqbelem = 2433
```

```
OneOneFirst04ibmqbelem = 1161
```

ZeroZeroFirst02ibmqbelem = 857  
 ZeroOneFirst02ibmqbelem = 4510  
 OneZeroFirst02ibmqbelem = 1508  
 OneOneFirst02ibmqbelem = 1317

ZeroZeroFirst00ibmqbelem = 874  
 ZeroOneFirst00ibmqbelem = 5060  
 OneZeroFirst00ibmqbelem = 913  
 OneOneFirst00ibmqbelem = 1345

ZeroZeroSecond02ibmqbelem = 1165  
 ZeroOneSecond02ibmqbelem = 4715  
 OneZeroSecond02ibmqbelem = 1100  
 OneOneSecond02ibmqbelem = 1212

ZeroZeroSecond04ibmqbelem = 1645  
 ZeroOneSecond04ibmqbelem = 4014  
 OneZeroSecond04ibmqbelem = 1659  
 OneOneSecond04ibmqbelem = 874

ZeroZeroSecond06ibmqbelem = 2183  
 ZeroOneSecond06ibmqbelem = 2858  
 OneZeroSecond06ibmqbelem = 2558  
 OneOneSecond06ibmqbelem = 593

ZeroZeroSecond08ibmqbelem = 2344  
 ZeroOneSecond08ibmqbelem = 1816  
 OneZeroSecond08ibmqbelem = 3641  
 OneOneSecond08ibmqbelem = 391

ZeroZeroSecond10ibmqbelem = 2407  
 ZeroOneSecond10ibmqbelem = 1320  
 OneZeroSecond10ibmqbelem = 4089  
 OneOneSecond10ibmqbelem = 376

CosSqibmqbelem =  $\{ \{-1 * \pi,$   
 $\text{ZeroZeroSecond10ibmqbelem} / (\text{OneZeroSecond10ibmqbelem} + \text{ZeroZeroSecond10ibmqbelem}) \},$   
 $\{-0.8 * \pi, \text{ZeroZeroSecond08ibmqbelem} /$   
 $(\text{OneZeroSecond08ibmqbelem} + \text{ZeroZeroSecond08ibmqbelem}) \}, \{-0.6 * \pi,$   
 $\text{ZeroZeroSecond06ibmqbelem} / (\text{OneZeroSecond06ibmqbelem} + \text{ZeroZeroSecond06ibmqbelem}) \},$   
 $\{-0.4 * \pi, \text{ZeroZeroSecond04ibmqbelem} /$   
 $(\text{OneZeroSecond04ibmqbelem} + \text{ZeroZeroSecond04ibmqbelem}) \}, \{-0.2 * \pi,$   
 $\text{ZeroZeroSecond02ibmqbelem} / (\text{OneZeroSecond02ibmqbelem} + \text{ZeroZeroSecond02ibmqbelem}) \},$   
 $\{0.0 * \pi, \text{ZeroZeroFirst00ibmqbelem} / (\text{OneZeroFirst00ibmqbelem} + \text{ZeroZeroFirst00ibmqbelem}) \},$   
 $\{0.2 * \pi, \text{ZeroZeroFirst02ibmqbelem} / (\text{OneZeroFirst02ibmqbelem} + \text{ZeroZeroFirst02ibmqbelem}) \},$   
 $\{0.4 * \pi, \text{ZeroZeroFirst04ibmqbelem} / (\text{OneZeroFirst04ibmqbelem} + \text{ZeroZeroFirst04ibmqbelem}) \},$   
 $\{0.6 * \pi, \text{ZeroZeroFirst06ibmqbelem} / (\text{OneZeroFirst06ibmqbelem} + \text{ZeroZeroFirst06ibmqbelem}) \},$   
 $\{0.8 * \pi, \text{ZeroZeroFirst08ibmqbelem} / (\text{OneZeroFirst08ibmqbelem} + \text{ZeroZeroFirst08ibmqbelem}) \},$   
 $\{1 * \pi, \text{ZeroZeroFirst10ibmqbelem} / (\text{OneZeroFirst10ibmqbelem} + \text{ZeroZeroFirst10ibmqbelem}) \} \}$   
 Decisivenessibmqbelem =

```
{ {-1 *  $\pi$ , (OneZeroSecond10ibmqbelem + ZeroZeroSecond10ibmqbelem) / 8192},
  {-0.8 *  $\pi$ , (OneZeroSecond08ibmqbelem + ZeroZeroSecond08ibmqbelem) / 8192},
  {-0.6 *  $\pi$ , (OneZeroSecond06ibmqbelem + ZeroZeroSecond06ibmqbelem) / 8192},
  {-0.4 *  $\pi$ , (OneZeroSecond04ibmqbelem + ZeroZeroSecond04ibmqbelem) / 8192},
  {-0.2 *  $\pi$ , (OneZeroSecond02ibmqbelem + ZeroZeroSecond02ibmqbelem) / 8192},
  {-0.0 *  $\pi$ , (OneZeroFirst00ibmqbelem + ZeroZeroFirst00ibmqbelem) / 8192},
  {0.2 *  $\pi$ , (OneZeroFirst02ibmqbelem + ZeroZeroFirst02ibmqbelem) / 8192},
  {0.4 *  $\pi$ , (OneZeroFirst04ibmqbelem + ZeroZeroFirst04ibmqbelem) / 8192},
  {0.6 *  $\pi$ , (OneZeroFirst06ibmqbelem + ZeroZeroFirst06ibmqbelem) / 8192},
  {0.8 *  $\pi$ , (OneZeroFirst08ibmqbelem + ZeroZeroFirst08ibmqbelem) / 8192},
  {1.0 *  $\pi$ , (OneZeroFirst10ibmqbelem + ZeroZeroFirst10ibmqbelem) / 8192}}
```

```
ExpCosSqibmqbelem = ListPlot[CosSqibmqbelem]
```

```
ExpDecisivenessibmqbelem = ListPlot[Decisivenessibmqbelem]
```

```
Out[ ]= 2407
```

```
Out[ ]= 1320
```

```
Out[ ]= 4089
```

```
Out[ ]= 376
```

```
Out[ ]= 2029
```

```
Out[ ]= 1565
```

```
Out[ ]= 4096
```

```
Out[ ]= 502
```

```
Out[ ]= 1619
```

```
Out[ ]= 2388
```

```
Out[ ]= 3367
```

```
Out[ ]= 818
```

```
Out[ ]= 1138
```

```
Out[ ]= 3460
```

```
Out[ ]= 2433
```

```
Out[ ]= 1161
```

```
Out[ ]= 857
```

```
Out[ ]= 4510
```

```
Out[ ]= 1508
```

```
Out[ ]= 1317
```

```
Out[ ]= 874
```

```
Out[ ]= 5060
```

$Out[\#]= 913$

$Out[\#]= 1345$

$Out[\#]= 1165$

$Out[\#]= 4715$

$Out[\#]= 1100$

$Out[\#]= 1212$

$Out[\#]= 1645$

$Out[\#]= 4014$

$Out[\#]= 1659$

$Out[\#]= 874$

$Out[\#]= 2183$

$Out[\#]= 2858$

$Out[\#]= 2558$

$Out[\#]= 593$

$Out[\#]= 2344$

$Out[\#]= 1816$

$Out[\#]= 3641$

$Out[\#]= 391$

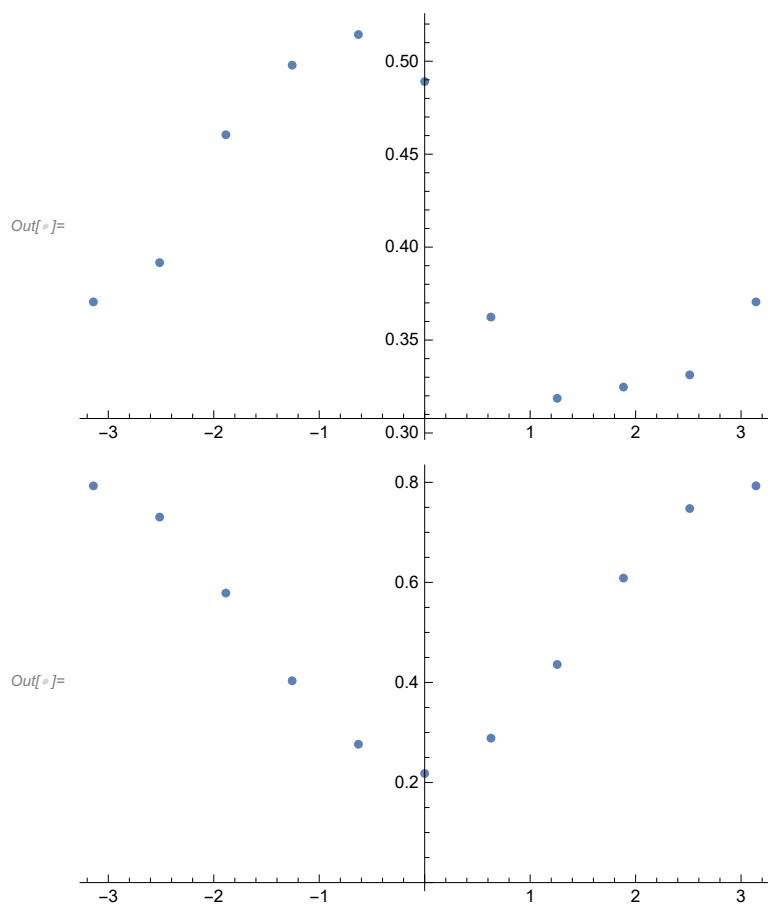
$Out[\#]= 2407$

$Out[\#]= 1320$

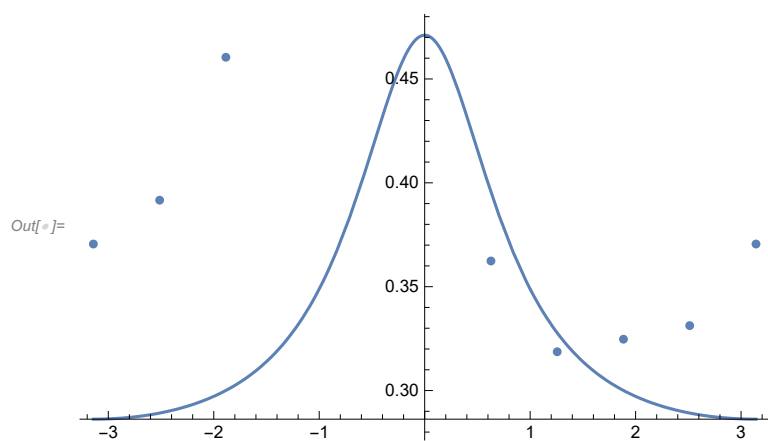
$Out[\#]= 4089$

$Out[\#]= 376$

$Out[\#]= \left\{ \left\{ -\pi, \frac{83}{224} \right\}, \left\{ -2.51327, \frac{2344}{5985} \right\}, \left\{ -1.88496, \frac{2183}{4741} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{235}{472} \right\}, \left\{ -0.628319, \frac{233}{453} \right\}, \left\{ 0., \frac{874}{1787} \right\}, \left\{ 0.628319, \frac{857}{2365} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{1138}{3571} \right\}, \left\{ 1.88496, \frac{1619}{4986} \right\}, \left\{ 2.51327, \frac{2029}{6125} \right\}, \left\{ \pi, \frac{83}{224} \right\} \right\}$   
 $Out[\#]= \left\{ \left\{ -\pi, \frac{203}{256} \right\}, \left\{ -2.51327, \frac{5985}{8192} \right\}, \left\{ -1.88496, \frac{4741}{8192} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{413}{1024} \right\}, \left\{ -0.628319, \frac{2265}{8192} \right\}, \left\{ 0., \frac{1787}{8192} \right\}, \left\{ 0.628319, \frac{2365}{8192} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{3571}{8192} \right\}, \left\{ 1.88496, \frac{2493}{4096} \right\}, \left\{ 2.51327, \frac{6125}{8192} \right\}, \left\{ 3.14159, \frac{203}{256} \right\} \right\}$

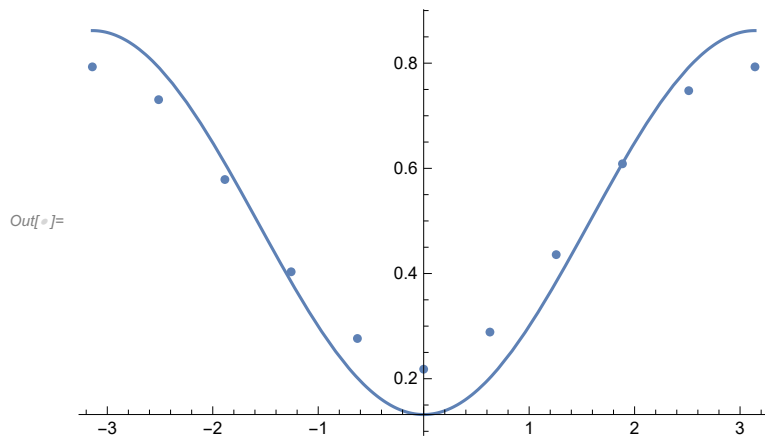


In[ ]:= Show[cosTH, ExpCosSqibmqbelem]





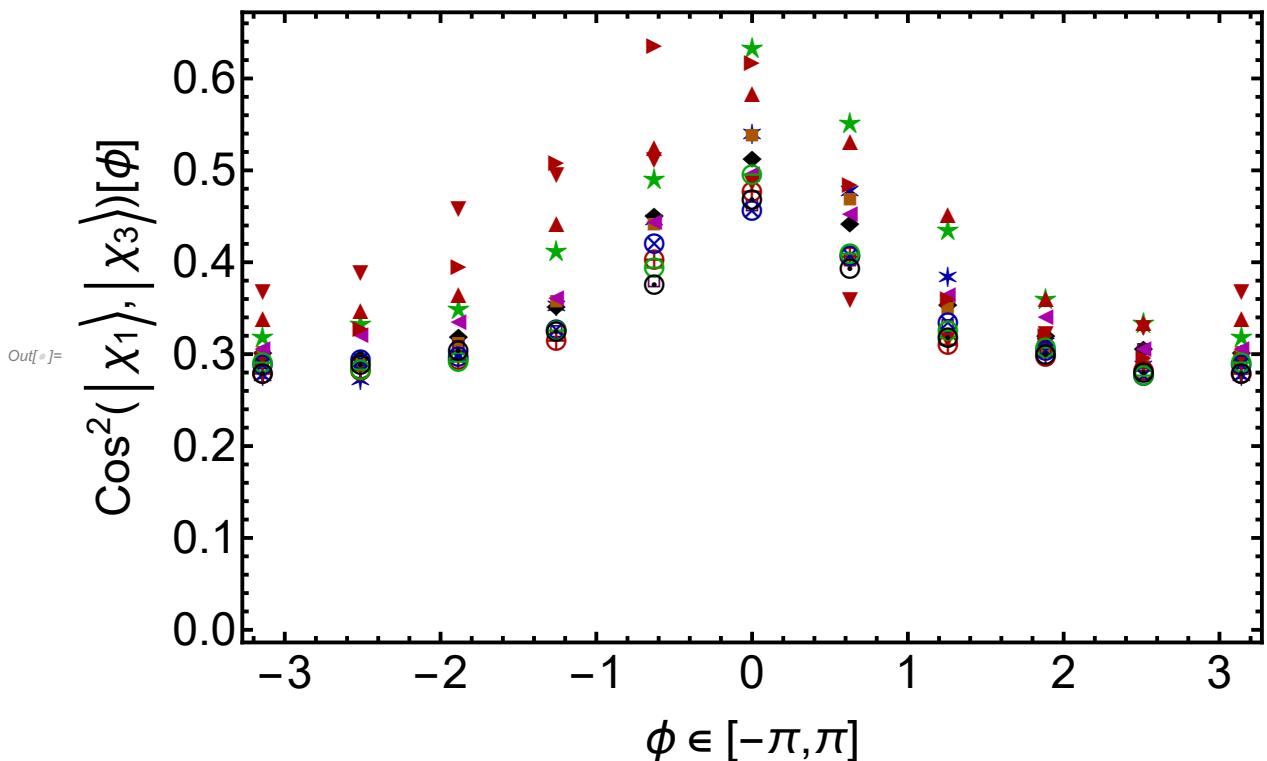
In[ ]:= Show[decTH, ExpDecisivenessibmqbelem]



```

In[ ]:= CosSqExperiment =
ListPlot[{CosSqibmperth, CosSqibmqjakarta, CosSqibmlagos, CosSqibmnairobi, CosSqibmoslo,
CosSqibmqmanila, CosSqibmqquito, CosSqibmqbelem, CosSqibmqlima, CosSqsimulatormps,
CosSqsimulatorextendedstabilizer, CosSqibmqqasmsimulator, CosSqsimulatorstatevector},
PlotStyle -> {Directive[Darker[Blue], Thickness[0.007]],
Directive[Darker[Green], Dashing[0.02], Thickness[0.007]], Directive[Darker[Black],
Thickness[0.005], Dotted], Directive[Darker[Orange], Thickness[0.007], Dashed],
Directive[Darker[Purple], Thickness[0.003]], Directive[Cross, Darker[Magenta],
Thickness[0.003]], Directive[Darker[Red], Dashing[0.02], Thickness[0.007]],
Directive[Darker[Red], Dashing[0.02], Thickness[0.007]],
Directive[Darker[Red], Dashing[0.02], Thickness[0.007]],
Directive[Darker[Red], Dashing[0.02], Thickness[0.007]]},
Frame -> True, FrameStyle -> Directive[Black, Thick], Frame -> True,
FrameStyle -> Directive[Black, Thick], LabelStyle -> Large,
PlotStyle -> {Directive[Darker[Green], Thickness[0.007]]}, Axes -> False,
FrameLabel -> {{ "Cos2(|χ1⟩, |χ3⟩)[ϕ]", }, {"ϕ ∈ [-π, π]", ""}},
LabelStyle -> {FontWeight -> "Bold", FontSize -> 25},
ImageSize -> 650, GridLinesStyle -> Directive[Thick, Gray],
PlotMarkers -> {{ "★", 15}, {"★", 15}, {"◆", 15}, {"■", 15}, {"□", 15}, {"◀", 15},
{"▶", 15}, {"▼", 15}, {"▲", 15}, {"⊕", 15}, {"⊗", 15}, {"⊖", 15}, {"⊙", 15}}]

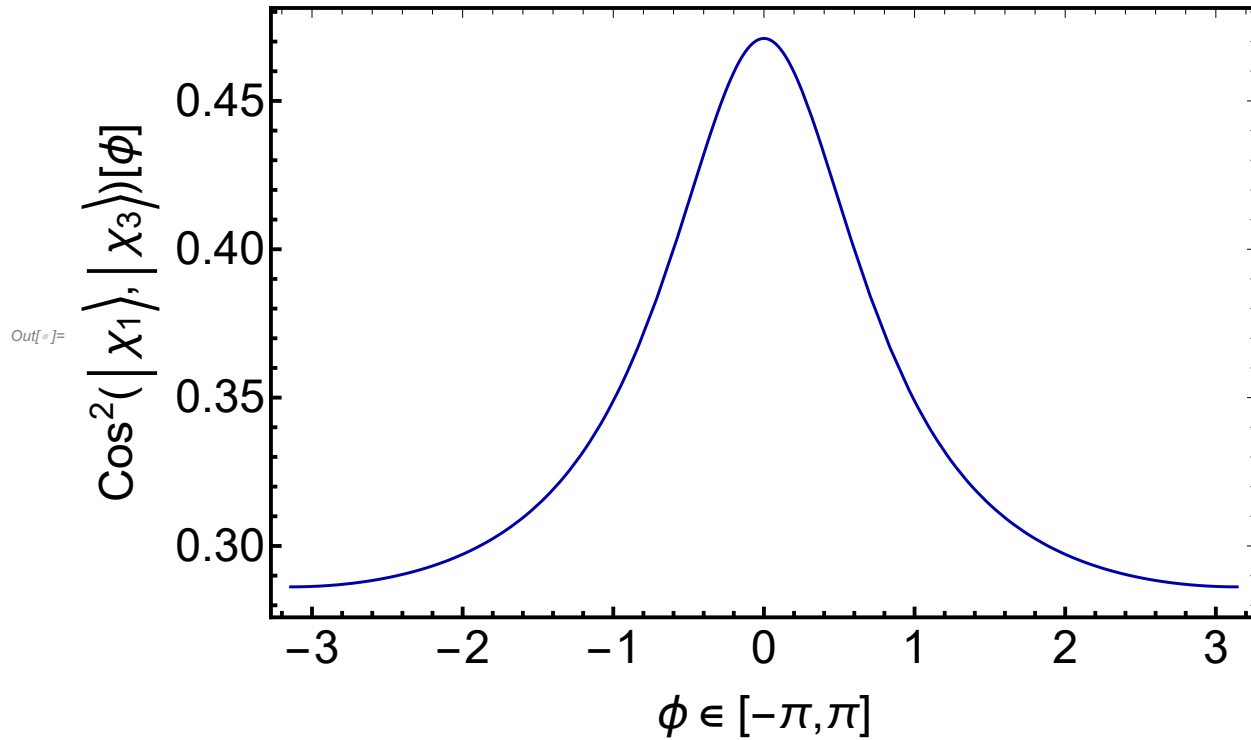
```



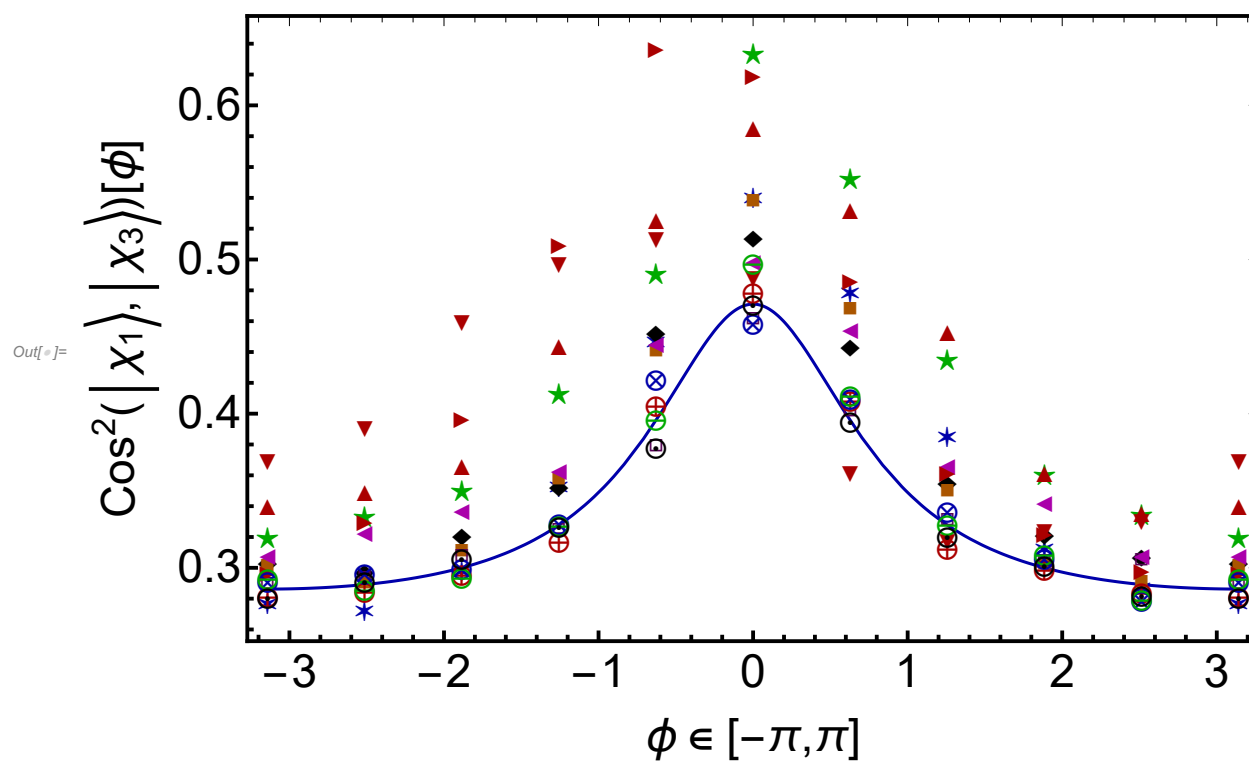
```

In[ ]:= CosSqTheory = Plot[1 - N[cosThirdFunction[-x, 4 / 5,  $\pi/2 - 1$ , 1]], {x, - $\pi$ ,  $\pi$ },
  PlotRange -> All, PlotStyle -> {Directive[Darker[Blue], Thickness[0.003]}],
  Frame -> True, FrameStyle -> Directive[Black, Thick], Frame -> True,
  FrameStyle -> Directive[Black, Thick], LabelStyle -> Large, Axes -> False,
  PlotStyle -> {Directive[Darker[Green], Thickness[0.007]}],
  FrameLabel -> {{ $\text{Cos}^2(|\chi_1\rangle, |\chi_3\rangle)[\phi]$ }, {" $\phi \in [-\pi, \pi]$ ", ""}},
  LabelStyle -> {FontWeight -> "Bold", FontSize -> 25},
  ImageSize -> 650, GridLinesStyle -> Directive[Thick, Gray]]

```



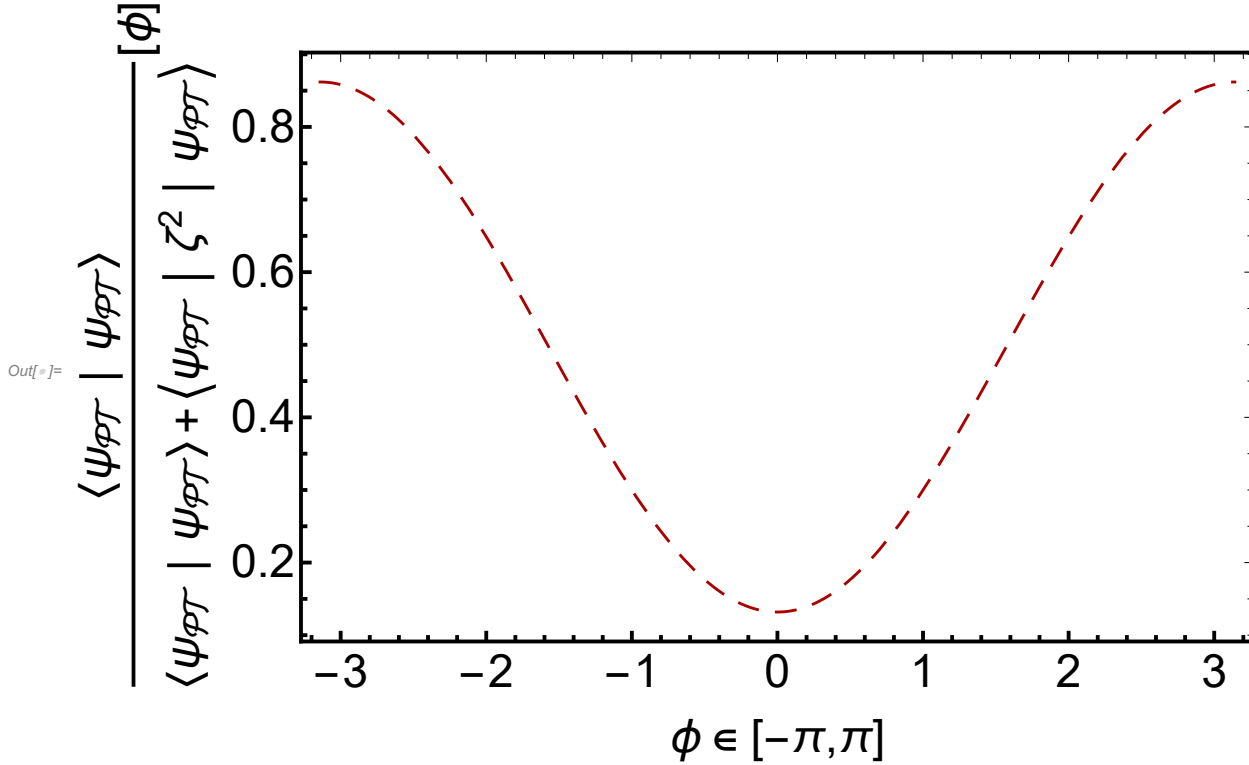
```
In[ ]:= p1 = Show[CosSqTheory, CosSqExperiment, PlotRange -> All]
```



```

In[ ]:= DecisivenessTheory = Plot[DecisivenessThirdFunction[-x, 4 / 5,  $\pi / 2 - 1$ , 3], {x, - $\pi$ ,  $\pi$ },
  PlotRange -> All, PlotStyle -> {Directive[Darker[Red], Dashing[0.02], Thickness[0.003]]},
  Frame -> True, FrameStyle -> Directive[Black, Thick], Frame -> True,
  FrameStyle -> Directive[Black, Thick], LabelStyle -> Large,
  PlotStyle -> {Directive[Darker[Green], Thickness[0.007]]}, Axes -> False,
  FrameLabel -> {{ $\frac{\langle \psi_{\phi_T} | \psi_{\phi_T} \rangle}{\langle \psi_{\phi_T} | \psi_{\phi_T} \rangle + \langle \psi_{\phi_T} | \xi^2 | \psi_{\phi_T} \rangle} [\phi]$ }, {" $\phi \in [-\pi, \pi]$ ", ""}},
  LabelStyle -> {FontWeight -> "Bold", FontSize -> 25},
  ImageSize -> 650, GridLinesStyle -> Directive[Thick, Gray]]

```

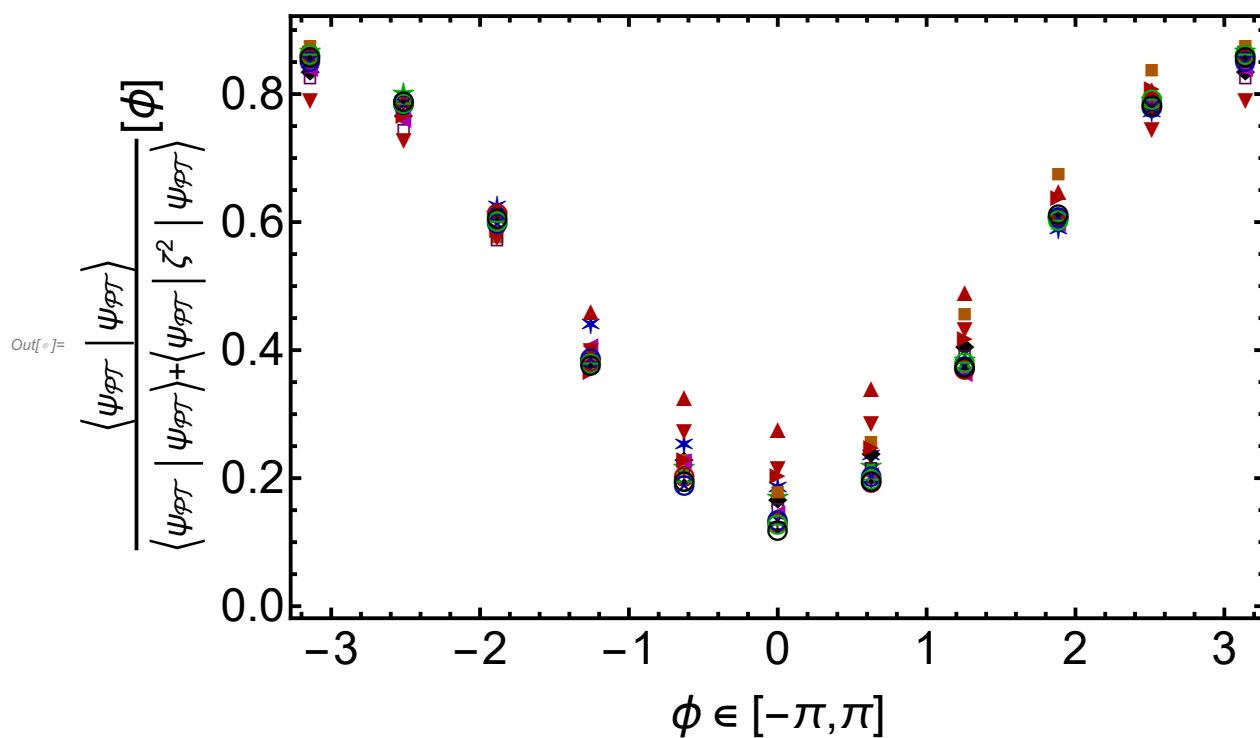


```

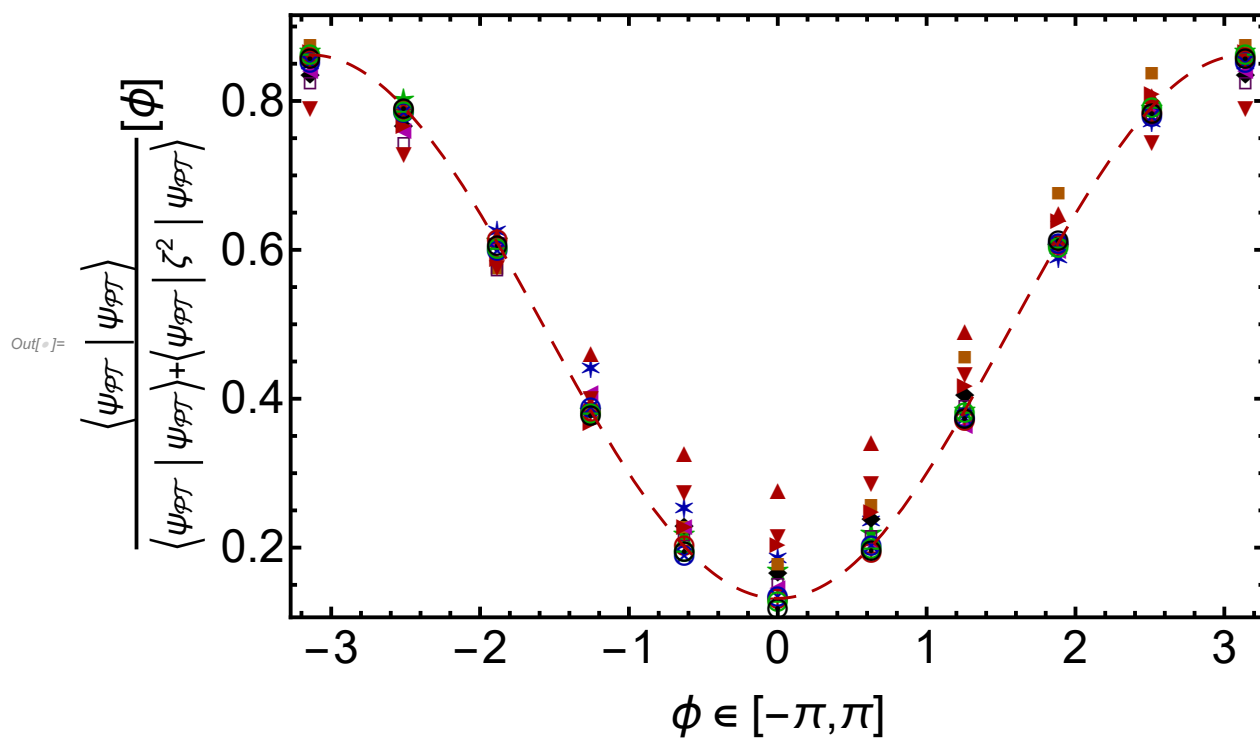
In[ ]:= DecisivenessExperiment =
  ListPlot[{Decisivenessibmperth, Decisivenessibmqjakarta, Decisivenessibmlagos,
    Decisivenessibmnairobi, Decisivenessibmoslo, Decisivenessibmqmanila,
    Decisivenessibmqquito, Decisivenessibmqbelem, Decisivenessibmqlima,
    Decisivenesssimulatormps, Decisivenesssimulatorextendedstabilizer,
    Decisivenessibmqqasmsimulator, Decisivenesssimulatorstatevector},
  PlotStyle → {Directive[Darker[Blue], Thickness[0.007]],
    Directive[Darker[Green], Dashing[0.02], Thickness[0.007]], Directive[Darker[Black],
    Thickness[0.005], Dotted], Directive[Darker[Orange], Thickness[0.007], Dashed],
    Directive[Darker[Purple], Thickness[0.003]], Directive[Cross, Darker[Magenta],
    Thickness[0.003]], Directive[Darker[Red], Dashing[0.02], Thickness[0.007]],
    Directive[Darker[Red], Dashing[0.02], Thickness[0.007]],
    Directive[Darker[Red], Dashing[0.02], Thickness[0.007]],
    Directive[Darker[Red], Dashing[0.02], Thickness[0.007]]},
  PlotLegends → LineLegend[{"ibm_perth", "ibmq_jakarta", "ibm_lagos",
    "ibm_nairobi", "ibm_oslo", "ibmq_manila", "ibmq_quito", "ibmq_belem",
    "ibmq_lima", "simulator_mps", "simulator_extended_stabilizer",
    "ibmq_qasm_simulator", "simulator_statevector"}, LegendFunction → Framed],
  Frame → True, FrameStyle → Directive[Black, Thick], LabelStyle → Large,
  PlotStyle → {Directive[Darker[Green], Thickness[0.007]]}, Axes → False,
  FrameLabel → {{

$$\frac{\langle \psi_{\mathcal{PT}} | \psi_{\mathcal{PT}} \rangle}{\langle \psi_{\mathcal{PT}} | \psi_{\mathcal{PT}} \rangle + \langle \psi_{\mathcal{PT}} | \xi^2 | \psi_{\mathcal{PT}} \rangle} [\phi], \}, {"\phi \in [-\pi, \pi]", ""}},
  LabelStyle → {FontWeight → "Bold", FontSize → 25},
  ImageSize → 650, GridLinesStyle → Directive[Thick, Gray],
  PlotMarkers → {{{"★", 15}, {"★", 15}, {"◆", 15}, {"■", 15}, {"□", 15}, {"◀", 15},
    {"▶", 15}, {"▼", 15}, {"▲", 15}, {"⊕", 15}, {"⊗", 15}, {"⊖", 15}, {"⊙", 15}}]$$

```



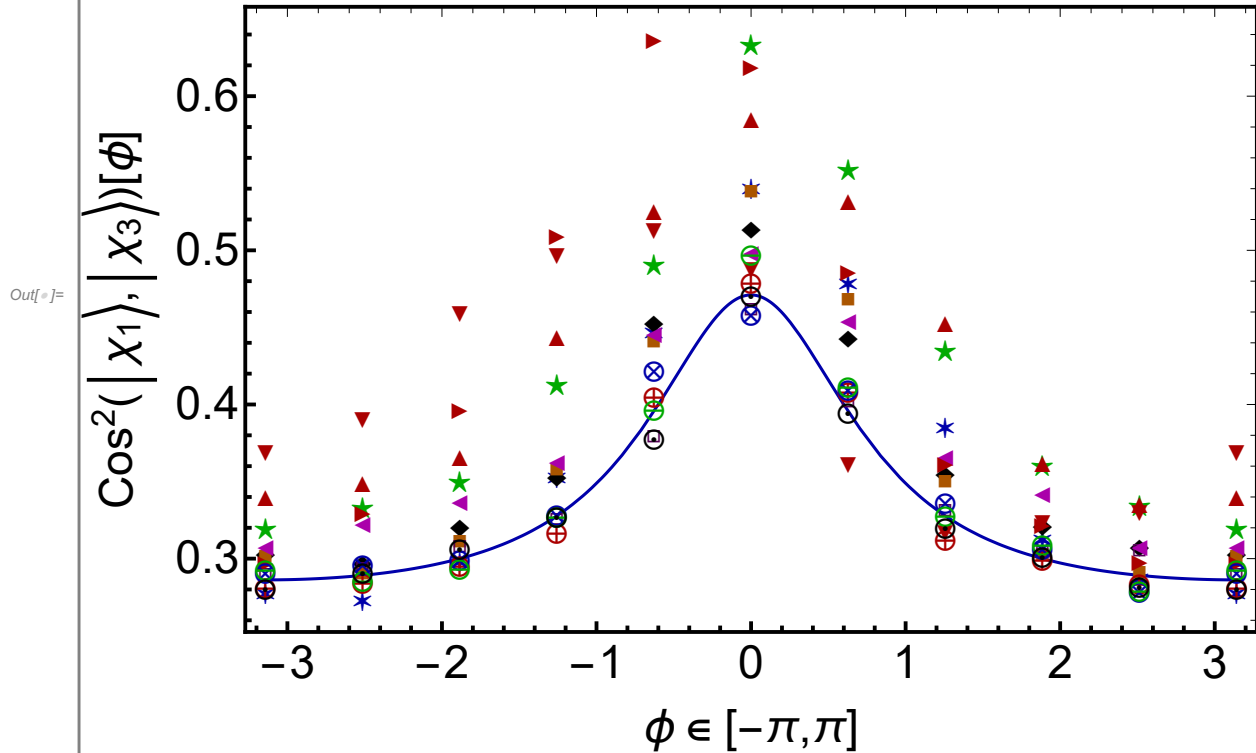
In[ ]:= p2 = Show[DecisivenessExperiment, DecisivenessTheory, PlotRange -> All]



```

In[ ]:= title = Panel[Style["First stage,  $\sigma = \frac{4}{5}$ ,  $\Delta = \frac{\sigma}{4}$ ,  $\alpha = \frac{\pi}{2} - 1$ ,  $\mathcal{N}(\theta) \approx \mathcal{N}_{\min}$ ", White, 20],
ImageSize → 500, Background → Blue, Alignment → Center];
DependenceVariation = Deploy@Grid[{{title, SpanFromLeft}}, {p1, p2}},
Dividers → Gray, Spacings → {0, 0}]

```



```

In[ ]:= Export["First45Three_8_9_2023.png", DependenceVariation, ImageSize → 10000]

```

Out[ ]:= First45Three\_8\_9\_2023.png

```

In[ ]:= (*ibm_perth*)
ZeroZeroFirst10ibmperth = 1931
ZeroOneFirst10ibmperth = 840
OneZeroFirst10ibmperth = 5035
OneOneFirst10ibmperth = 386

ZeroZeroFirst08ibmperth = 1819
ZeroOneFirst08ibmperth = 1333
OneZeroFirst08ibmperth = 4509
OneOneFirst08ibmperth = 531

```



ZeroZeroFirst06ibmperth = 1510  
 ZeroOneFirst06ibmperth = 2498  
 OneZeroFirst06ibmperth = 3323  
 OneOneFirst06ibmperth = 861

ZeroZeroFirst04ibmperth = 1194  
 ZeroOneFirst04ibmperth = 3792  
 OneZeroFirst04ibmperth = 1906  
 OneOneFirst04ibmperth = 1300

ZeroZeroFirst02ibmperth = 929  
 ZeroOneFirst02ibmperth = 4720  
 OneZeroFirst02ibmperth = 1012  
 OneOneFirst02ibmperth = 1531

ZeroZeroFirst00ibmperth = 829  
 ZeroOneFirst00ibmperth = 5034  
 OneZeroFirst00ibmperth = 706  
 OneOneFirst00ibmperth = 1623

ZeroZeroSecond02ibmperth = 929  
 ZeroOneSecond02ibmperth = 4562  
 OneZeroSecond02ibmperth = 1150  
 OneOneSecond02ibmperth = 1551

ZeroZeroSecond04ibmperth = 1278  
 ZeroOneSecond04ibmperth = 3387  
 OneZeroSecond04ibmperth = 2343  
 OneOneSecond04ibmperth = 1184

ZeroZeroSecond06ibmperth = 1531  
 ZeroOneSecond06ibmperth = 2267  
 OneZeroSecond06ibmperth = 3598  
 OneOneSecond06ibmperth = 796

ZeroZeroSecond08ibmperth = 1766  
 ZeroOneSecond08ibmperth = 1255  
 OneZeroSecond08ibmperth = 4710  
 OneOneSecond08ibmperth = 461

ZeroZeroSecond10ibmperth = 1931  
 ZeroOneSecond10ibmperth = 840  
 OneZeroSecond10ibmperth = 5035  
 OneOneSecond10ibmperth = 386

CosSqibmperth =  
 $\left\{ \left\{ -1 * \pi, \text{ZeroZeroSecond10ibmperth} / \left( \text{OneZeroSecond10ibmperth} + \text{ZeroZeroSecond10ibmperth} \right) \right\}, \right.$   
 $\left. \left\{ -0.8 * \pi, \text{ZeroZeroSecond08ibmperth} / \right. \right.$   
 $\left. \left( \text{OneZeroSecond08ibmperth} + \text{ZeroZeroSecond08ibmperth} \right) \right\}, \left\{ -0.6 * \pi, \right.$   
 $\left. \text{ZeroZeroSecond06ibmperth} / \left( \text{OneZeroSecond06ibmperth} + \text{ZeroZeroSecond06ibmperth} \right) \right\},$

```

{-0.4 *  $\pi$ , ZeroZeroSecond04ibmperth /
  (OneZeroSecond04ibmperth + ZeroZeroSecond04ibmperth)}, {-0.2 *  $\pi$ ,
  ZeroZeroSecond02ibmperth / (OneZeroSecond02ibmperth + ZeroZeroSecond02ibmperth)},
{0.0 *  $\pi$ , ZeroZeroFirst00ibmperth / (OneZeroFirst00ibmperth + ZeroZeroFirst00ibmperth)},
{0.2 *  $\pi$ , ZeroZeroFirst02ibmperth / (OneZeroFirst02ibmperth + ZeroZeroFirst02ibmperth)},
{0.4 *  $\pi$ , ZeroZeroFirst04ibmperth / (OneZeroFirst04ibmperth + ZeroZeroFirst04ibmperth)},
{0.6 *  $\pi$ , ZeroZeroFirst06ibmperth / (OneZeroFirst06ibmperth + ZeroZeroFirst06ibmperth)},
{0.8 *  $\pi$ , ZeroZeroFirst08ibmperth / (OneZeroFirst08ibmperth + ZeroZeroFirst08ibmperth)},
{1 *  $\pi$ , ZeroZeroFirst10ibmperth / (OneZeroFirst10ibmperth + ZeroZeroFirst10ibmperth)}}
Decisivenessibmperth =
{{-1 *  $\pi$ , (OneZeroSecond10ibmperth + ZeroZeroSecond10ibmperth) / 8192},
{-0.8 *  $\pi$ , (OneZeroSecond08ibmperth + ZeroZeroSecond08ibmperth) / 8192},
{-0.6 *  $\pi$ , (OneZeroSecond06ibmperth + ZeroZeroSecond06ibmperth) / 8192},
{-0.4 *  $\pi$ , (OneZeroSecond04ibmperth + ZeroZeroSecond04ibmperth) / 8192},
{-0.2 *  $\pi$ , (OneZeroSecond02ibmperth + ZeroZeroSecond02ibmperth) / 8192},
{-0.0 *  $\pi$ , (OneZeroFirst00ibmperth + ZeroZeroFirst00ibmperth) / 8192},
{0.2 *  $\pi$ , (OneZeroFirst02ibmperth + ZeroZeroFirst02ibmperth) / 8192},
{0.4 *  $\pi$ , (OneZeroFirst04ibmperth + ZeroZeroFirst04ibmperth) / 8192},
{0.6 *  $\pi$ , (OneZeroFirst06ibmperth + ZeroZeroFirst06ibmperth) / 8192},
{0.8 *  $\pi$ , (OneZeroFirst08ibmperth + ZeroZeroFirst08ibmperth) / 8192},
{1.0 *  $\pi$ , (OneZeroFirst10ibmperth + ZeroZeroFirst10ibmperth) / 8192}}
ExpCosSqibmperth = ListPlot[CosSqibmperth]
ExpDecisivenessibmperth = ListPlot[Decisivenessibmperth]
Show[cosTH, ExpCosSqibmperth, PlotRange -> All]
Show[decTH, ExpDecisivenessibmperth]

```

Out[ ]= 1931

Out[ ]= 840

Out[ ]= 5035

Out[ ]= 386

Out[ ]= 1819

Out[ ]= 1333

Out[ ]= 4509

Out[ ]= 531

Out[ ]= 1510

Out[ ]= 2498

Out[ ]= 3323

Out[ ]= 861

Out[ ]= 1194

Out[ ]= 3792

Out[ ]= 1906

Out[ ]= 1300

Out[ ]= 929

Out[ ]= 4720

Out[ ]= 1012

Out[ ]= 1531

Out[ ]= 829

Out[ ]= 5034

Out[ ]= 706

Out[ ]= 1623

Out[ ]= 929

Out[ ]= 4562

Out[ ]= 1150

Out[ ]= 1551

Out[ ]= 1278

Out[ ]= 3387

Out[ ]= 2343

Out[ ]= 1184

Out[ ]= 1531

Out[ ]= 2267

Out[ ]= 3598

Out[ ]= 796

Out[ ]= 1766

Out[ ]= 1255

Out[ ]= 4710

Out[ ]= 461

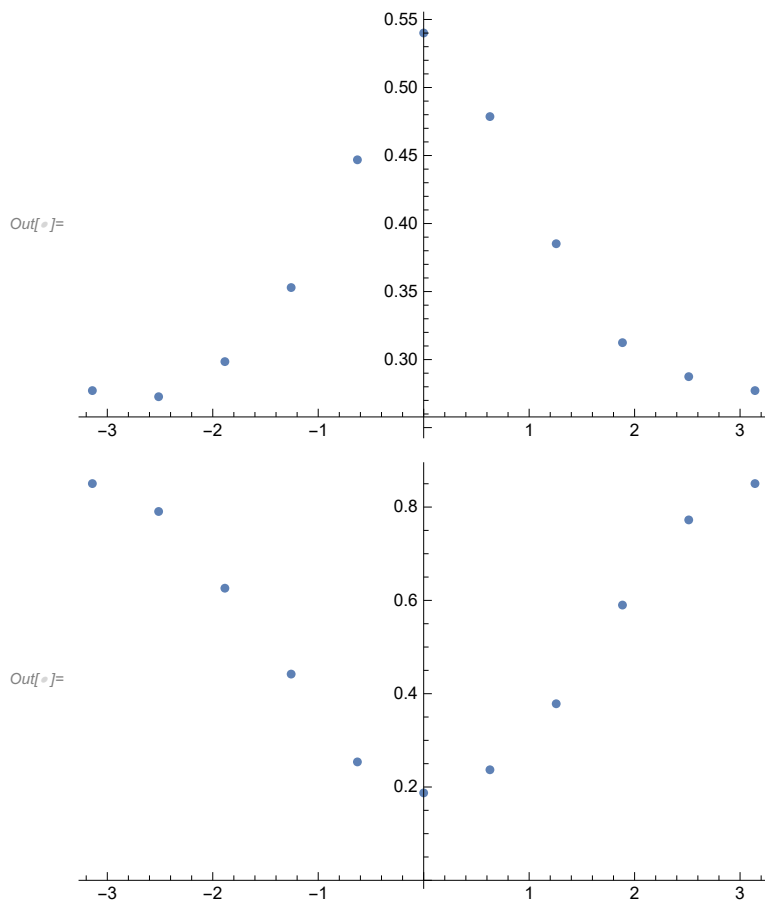
Out[ ]= 1931

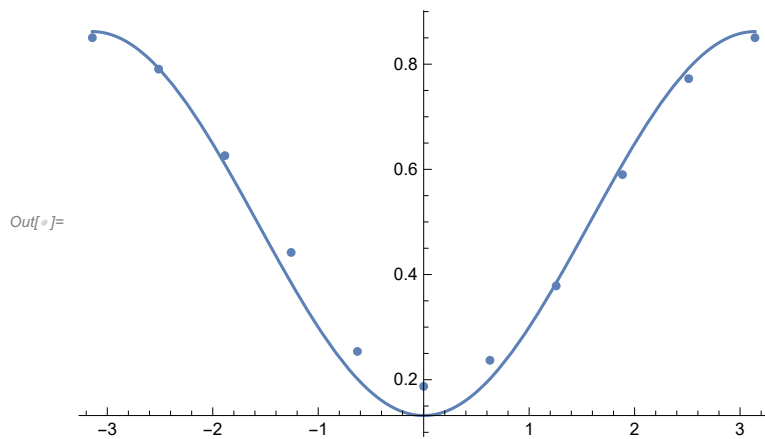
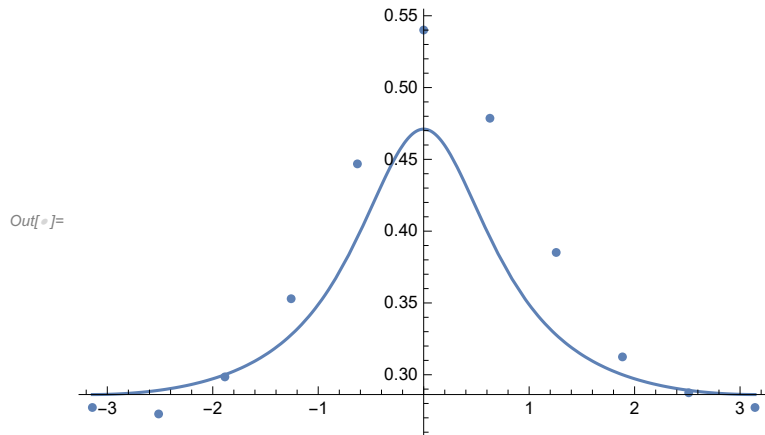
Out[ ]= 840

Out[ ]= 5035

Out[ ]= 386

$$\begin{aligned}
 Out[8]= & \left\{ \left\{ -\pi, \frac{1931}{6966} \right\}, \left\{ -2.51327, \frac{883}{3238} \right\}, \left\{ -1.88496, \frac{1531}{5129} \right\}, \right. \\
 & \left\{ -1.25664, \frac{6}{17} \right\}, \left\{ -0.628319, \frac{929}{2079} \right\}, \left\{ 0., \frac{829}{1535} \right\}, \left\{ 0.628319, \frac{929}{1941} \right\}, \\
 & \left. \left\{ 1.25664, \frac{597}{1550} \right\}, \left\{ 1.88496, \frac{1510}{4833} \right\}, \left\{ 2.51327, \frac{1819}{6328} \right\}, \left\{ \pi, \frac{1931}{6966} \right\} \right\} \\
 \\
 Out[9]= & \left\{ \left\{ -\pi, \frac{3483}{4096} \right\}, \left\{ -2.51327, \frac{1619}{2048} \right\}, \left\{ -1.88496, \frac{5129}{8192} \right\}, \right. \\
 & \left\{ -1.25664, \frac{3621}{8192} \right\}, \left\{ -0.628319, \frac{2079}{8192} \right\}, \left\{ 0., \frac{1535}{8192} \right\}, \left\{ 0.628319, \frac{1941}{8192} \right\}, \\
 & \left. \left\{ 1.25664, \frac{775}{2048} \right\}, \left\{ 1.88496, \frac{4833}{8192} \right\}, \left\{ 2.51327, \frac{791}{1024} \right\}, \left\{ 3.14159, \frac{3483}{4096} \right\} \right\}
 \end{aligned}$$





```

In[ \# ]:= (*ibmq_jakarta*)
ZeroZeroFirst10ibmqjakarta = 2273
ZeroOneFirst10ibmqjakarta = 956
OneZeroFirst10ibmqjakarta = 4841
OneOneFirst10ibmqjakarta = 122

ZeroZeroFirst08ibmqjakarta = 2169
ZeroOneFirst08ibmqjakarta = 1533
OneZeroFirst08ibmqjakarta = 4312
OneOneFirst08ibmqjakarta = 178

ZeroZeroFirst06ibmqjakarta = 1787
ZeroOneFirst06ibmqjakarta = 2727
OneZeroFirst06ibmqjakarta = 3167
OneOneFirst06ibmqjakarta = 511

ZeroZeroFirst04ibmqjakarta = 1377
ZeroOneFirst04ibmqjakarta = 4157
OneZeroFirst04ibmqjakarta = 1786
OneOneFirst04ibmqjakarta = 872

ZeroZeroFirst02ibmqjakarta = 998
ZeroOneFirst02ibmqjakarta = 5313
OneZeroFirst02ibmqjakarta = 808

```

OneOneFirst02ibmqjakarta = 1073

ZeroZeroFirst00ibmqjakarta = 887

ZeroOneFirst00ibmqjakarta = 5516

OneZeroFirst00ibmqjakarta = 513

OneOneFirst00ibmqjakarta = 1276

ZeroZeroSecond02ibmqjakarta = 881

ZeroOneSecond02ibmqjakarta = 5198

OneZeroSecond02ibmqjakarta = 914

OneOneSecond02ibmqjakarta = 1199

ZeroZeroSecond04ibmqjakarta = 1299

ZeroOneSecond04ibmqjakarta = 4075

OneZeroSecond04ibmqjakarta = 1846

OneOneSecond04ibmqjakarta = 972

ZeroZeroSecond06ibmqjakarta = 1760

ZeroOneSecond06ibmqjakarta = 2571

OneZeroSecond06ibmqjakarta = 3264

OneOneSecond06ibmqjakarta = 597

ZeroZeroSecond08ibmqjakarta = 2193

ZeroOneSecond08ibmqjakarta = 1298

OneZeroSecond08ibmqjakarta = 4386

OneOneSecond08ibmqjakarta = 315

ZeroZeroSecond10ibmqjakarta = 2273

ZeroOneSecond10ibmqjakarta = 956

OneZeroSecond10ibmqjakarta = 4841

OneOneSecond10ibmqjakarta = 122

$$\text{CosSqibmqjakarta} = \left\{ \left\{ -1 * \pi, \text{ZeroZeroSecond10ibmqjakarta} / \right. \right. \\
\left. \left. \left( \text{OneZeroSecond10ibmqjakarta} + \text{ZeroZeroSecond10ibmqjakarta} \right) \right\}, \right. \\
\left\{ -0.8 * \pi, \text{ZeroZeroSecond08ibmqjakarta} / \right. \\
\left. \left( \text{OneZeroSecond08ibmqjakarta} + \text{ZeroZeroSecond08ibmqjakarta} \right) \right\}, \\
\left\{ -0.6 * \pi, \text{ZeroZeroSecond06ibmqjakarta} / \left( \text{OneZeroSecond06ibmqjakarta} + \right. \right. \\
\left. \left. \text{ZeroZeroSecond06ibmqjakarta} \right) \right\}, \left\{ -0.4 * \pi, \text{ZeroZeroSecond04ibmqjakarta} / \right. \\
\left. \left( \text{OneZeroSecond04ibmqjakarta} + \text{ZeroZeroSecond04ibmqjakarta} \right) \right\}, \\
\left\{ -0.2 * \pi, \text{ZeroZeroSecond02ibmqjakarta} / \right. \\
\left. \left( \text{OneZeroSecond02ibmqjakarta} + \text{ZeroZeroSecond02ibmqjakarta} \right) \right\}, \left\{ 0.0 * \pi, \right. \\
\left. \text{ZeroZeroFirst00ibmqjakarta} / \left( \text{OneZeroFirst00ibmqjakarta} + \text{ZeroZeroFirst00ibmqjakarta} \right) \right\}, \\
\left\{ 0.2 * \pi, \text{ZeroZeroFirst02ibmqjakarta} / \right. \\
\left. \left( \text{OneZeroFirst02ibmqjakarta} + \text{ZeroZeroFirst02ibmqjakarta} \right) \right\}, \left\{ 0.4 * \pi, \right. \\
\left. \text{ZeroZeroFirst04ibmqjakarta} / \left( \text{OneZeroFirst04ibmqjakarta} + \text{ZeroZeroFirst04ibmqjakarta} \right) \right\}, \\
\left\{ 0.6 * \pi, \text{ZeroZeroFirst06ibmqjakarta} / \right. \\
\left. \left( \text{OneZeroFirst06ibmqjakarta} + \text{ZeroZeroFirst06ibmqjakarta} \right) \right\}, \left\{ 0.8 * \pi, \right. \\
\left. \text{ZeroZeroFirst08ibmqjakarta} / \left( \text{OneZeroFirst08ibmqjakarta} + \text{ZeroZeroFirst08ibmqjakarta} \right) \right\}, \\
\left\{ 1 * \pi, \text{ZeroZeroFirst10ibmqjakarta} / \right. \\
\left. \left( \text{OneZeroFirst10ibmqjakarta} + \text{ZeroZeroFirst10ibmqjakarta} \right) \right\} \}$$

```

Decisivenessibmqjakarta = { {-1 *  $\pi$ ,
  (OneZeroSecond10ibmqjakarta + ZeroZeroSecond10ibmqjakarta) / 8192},
  {-0.8 *  $\pi$ , (OneZeroSecond08ibmqjakarta + ZeroZeroSecond08ibmqjakarta) / 8192},
  {-0.6 *  $\pi$ , (OneZeroSecond06ibmqjakarta + ZeroZeroSecond06ibmqjakarta) / 8192},
  {-0.4 *  $\pi$ , (OneZeroSecond04ibmqjakarta + ZeroZeroSecond04ibmqjakarta) / 8192},
  {-0.2 *  $\pi$ , (OneZeroSecond02ibmqjakarta + ZeroZeroSecond02ibmqjakarta) / 8192},
  {-0.0 *  $\pi$ , (OneZeroFirst00ibmqjakarta + ZeroZeroFirst00ibmqjakarta) / 8192},
  {0.2 *  $\pi$ , (OneZeroFirst02ibmqjakarta + ZeroZeroFirst02ibmqjakarta) / 8192},
  {0.4 *  $\pi$ , (OneZeroFirst04ibmqjakarta + ZeroZeroFirst04ibmqjakarta) / 8192},
  {0.6 *  $\pi$ , (OneZeroFirst06ibmqjakarta + ZeroZeroFirst06ibmqjakarta) / 8192},
  {0.8 *  $\pi$ , (OneZeroFirst08ibmqjakarta + ZeroZeroFirst08ibmqjakarta) / 8192},
  {1.0 *  $\pi$ , (OneZeroFirst10ibmqjakarta + ZeroZeroFirst10ibmqjakarta) / 8192}}
ExpCosSqibmqjakarta = ListPlot[CosSqibmqjakarta]
ExpDecisivenessibmqjakarta = ListPlot[Decisivenessibmqjakarta]
Show[cosTH, ExpCosSqibmqjakarta, PlotRange -> All]
Show[decTH, ExpDecisivenessibmqjakarta]

```

Out[ ]= 2273

Out[ ]= 956

Out[ ]= 4841

Out[ ]= 122

Out[ ]= 2169

Out[ ]= 1533

Out[ ]= 4312

Out[ ]= 178

Out[ ]= 1787

Out[ ]= 2727

Out[ ]= 3167

Out[ ]= 511

Out[ ]= 1377

Out[ ]= 4157

Out[ ]= 1786

Out[ ]= 872

Out[ ]= 998

Out[ ]= 5313

Out[ ]= 808

Out[ ]= 1073

Out[ ]= 887

Out[ ]= 5516

Out[ ]= 513

Out[ ]= 1276

Out[ ]= 881

Out[ ]= 5198

Out[ ]= 914

Out[ ]= 1199

Out[ ]= 1299

Out[ ]= 4075

Out[ ]= 1846

Out[ ]= 972

Out[ ]= 1760

Out[ ]= 2571

Out[ ]= 3264

Out[ ]= 597

Out[ ]= 2193

Out[ ]= 1298

Out[ ]= 4386

Out[ ]= 315

Out[ ]= 2273

Out[ ]= 956

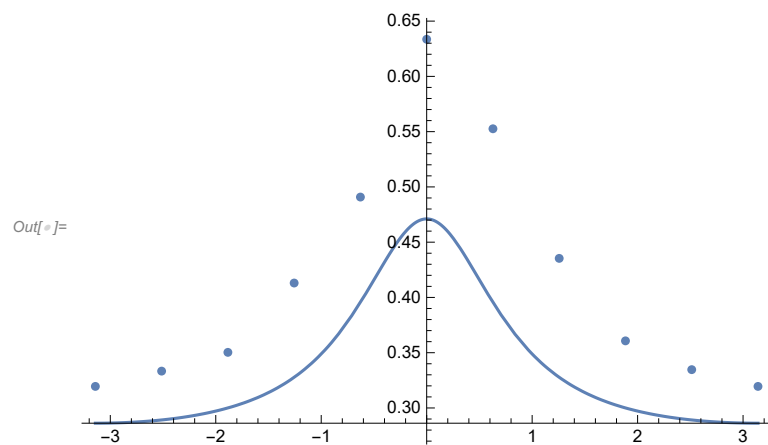
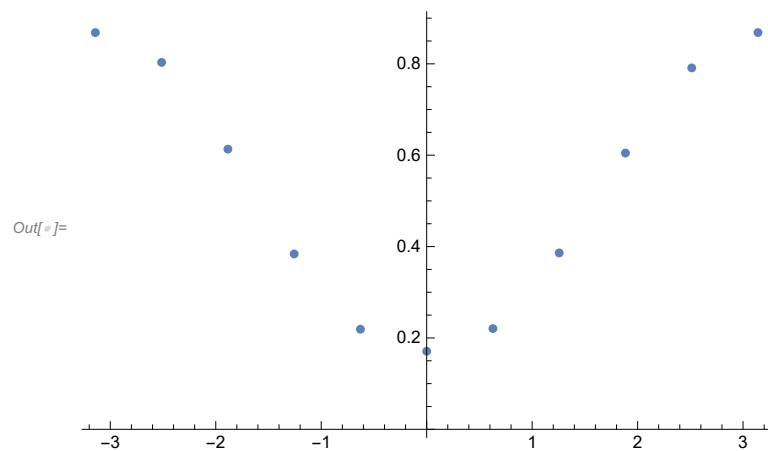
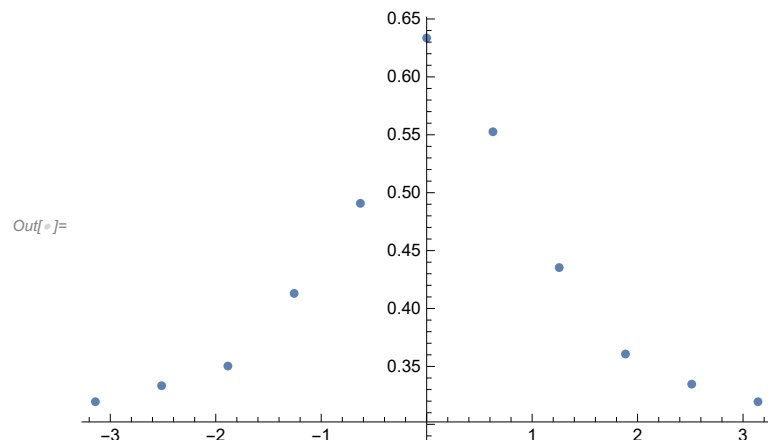
Out[ ]= 4841

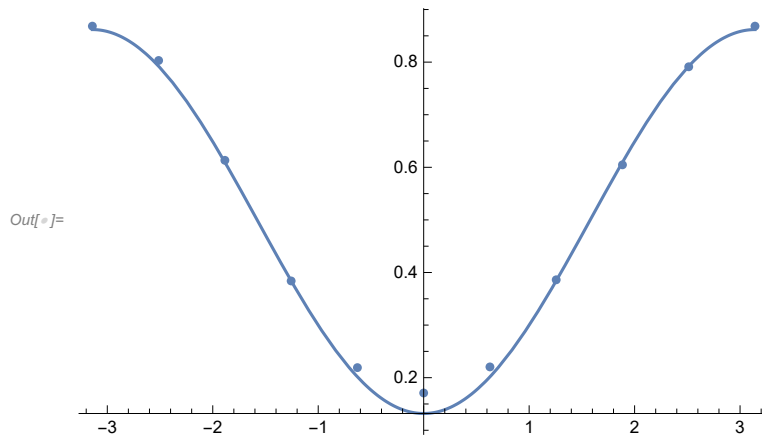
Out[ ]= 122

Out[ ]=  $\left\{ \left\{ -\pi, \frac{2273}{7114} \right\}, \left\{ -2.51327, \frac{1}{3} \right\}, \left\{ -1.88496, \frac{55}{157} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{1299}{3145} \right\}, \left\{ -0.628319, \frac{881}{1795} \right\}, \left\{ 0., \frac{887}{1400} \right\}, \left\{ 0.628319, \frac{499}{903} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{1377}{3163} \right\}, \left\{ 1.88496, \frac{1787}{4954} \right\}, \left\{ 2.51327, \frac{2169}{6481} \right\}, \left\{ \pi, \frac{2273}{7114} \right\} \right\}$



$Out[ \# ] = \left\{ \left\{ -\pi, \frac{3557}{4096} \right\}, \left\{ -2.51327, \frac{6579}{8192} \right\}, \left\{ -1.88496, \frac{157}{256} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{3145}{8192} \right\}, \left\{ -0.628319, \frac{1795}{8192} \right\}, \left\{ 0., \frac{175}{1024} \right\}, \left\{ 0.628319, \frac{903}{4096} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{3163}{8192} \right\}, \left\{ 1.88496, \frac{2477}{4096} \right\}, \left\{ 2.51327, \frac{6481}{8192} \right\}, \left\{ 3.14159, \frac{3557}{4096} \right\} \right\}$





```
In[ ]:= (*ibm_lagos*)
ZeroZeroFirst10ibmlagos = 2088
ZeroOneFirst10ibmlagos = 1157
OneZeroFirst10ibmlagos = 4782
OneOneFirst10ibmlagos = 165

ZeroZeroFirst08ibmlagos = 1995
ZeroOneFirst08ibmlagos = 1486
OneZeroFirst08ibmlagos = 4475
OneOneFirst08ibmlagos = 236

ZeroZeroFirst06ibmlagos = 1620
ZeroOneFirst06ibmlagos = 2640
OneZeroFirst06ibmlagos = 3407
OneOneFirst06ibmlagos = 525

ZeroZeroFirst04ibmlagos = 1193
ZeroOneFirst04ibmlagos = 3915
OneZeroFirst04ibmlagos = 2159
OneOneFirst04ibmlagos = 925

ZeroZeroFirst02ibmlagos = 882
ZeroOneFirst02ibmlagos = 4985
OneZeroFirst02ibmlagos = 1103
OneOneFirst02ibmlagos = 1222

ZeroZeroFirst00ibmlagos = 718
ZeroOneFirst00ibmlagos = 5404
OneZeroFirst00ibmlagos = 676
OneOneFirst00ibmlagos = 1394

ZeroZeroSecond02ibmlagos = 863
ZeroOneSecond02ibmlagos = 5008
OneZeroSecond02ibmlagos = 1039
OneOneSecond02ibmlagos = 1282

ZeroZeroSecond04ibmlagos = 1125
ZeroOneSecond04ibmlagos = 3931
```

OneZeroSecond04ibmlagos = 2055

OneOneSecond04ibmlagos = 1081

ZeroZeroSecond06ibmlagos = 1611

ZeroOneSecond06ibmlagos = 2570

OneZeroSecond06ibmlagos = 3400

OneOneSecond06ibmlagos = 611

ZeroZeroSecond08ibmlagos = 1880

ZeroOneSecond08ibmlagos = 1579

OneZeroSecond08ibmlagos = 4423

OneOneSecond08ibmlagos = 310

ZeroZeroSecond10ibmlagos = 2088

ZeroOneSecond10ibmlagos = 1157

OneZeroSecond10ibmlagos = 4782

OneOneSecond10ibmlagos = 165

CosSqibmlagos =

```
{ {-1 *  $\pi$ , ZeroZeroSecond10ibmlagos / (OneZeroSecond10ibmlagos + ZeroZeroSecond10ibmlagos)},
  {-0.8 *  $\pi$ , ZeroZeroSecond08ibmlagos /
    (OneZeroSecond08ibmlagos + ZeroZeroSecond08ibmlagos)}, {-0.6 *  $\pi$ ,
    ZeroZeroSecond06ibmlagos / (OneZeroSecond06ibmlagos + ZeroZeroSecond06ibmlagos)},
  {-0.4 *  $\pi$ , ZeroZeroSecond04ibmlagos /
    (OneZeroSecond04ibmlagos + ZeroZeroSecond04ibmlagos)}, {-0.2 *  $\pi$ ,
    ZeroZeroSecond02ibmlagos / (OneZeroSecond02ibmlagos + ZeroZeroSecond02ibmlagos)},
  {0.0 *  $\pi$ , ZeroZeroFirst00ibmlagos / (OneZeroFirst00ibmlagos + ZeroZeroFirst00ibmlagos)},
  {0.2 *  $\pi$ , ZeroZeroFirst02ibmlagos / (OneZeroFirst02ibmlagos + ZeroZeroFirst02ibmlagos)},
  {0.4 *  $\pi$ , ZeroZeroFirst04ibmlagos / (OneZeroFirst04ibmlagos + ZeroZeroFirst04ibmlagos)},
  {0.6 *  $\pi$ , ZeroZeroFirst06ibmlagos / (OneZeroFirst06ibmlagos + ZeroZeroFirst06ibmlagos)},
  {0.8 *  $\pi$ , ZeroZeroFirst08ibmlagos / (OneZeroFirst08ibmlagos + ZeroZeroFirst08ibmlagos)},
  {1 *  $\pi$ , ZeroZeroFirst10ibmlagos / (OneZeroFirst10ibmlagos + ZeroZeroFirst10ibmlagos)} }
```

Decisivenessibmlagos =

```
{ {-1 *  $\pi$ , (OneZeroSecond10ibmlagos + ZeroZeroSecond10ibmlagos) / 8192},
  {-0.8 *  $\pi$ , (OneZeroSecond08ibmlagos + ZeroZeroSecond08ibmlagos) / 8192},
  {-0.6 *  $\pi$ , (OneZeroSecond06ibmlagos + ZeroZeroSecond06ibmlagos) / 8192},
  {-0.4 *  $\pi$ , (OneZeroSecond04ibmlagos + ZeroZeroSecond04ibmlagos) / 8192},
  {-0.2 *  $\pi$ , (OneZeroSecond02ibmlagos + ZeroZeroSecond02ibmlagos) / 8192},
  {-0.0 *  $\pi$ , (OneZeroFirst00ibmlagos + ZeroZeroFirst00ibmlagos) / 8192},
  {0.2 *  $\pi$ , (OneZeroFirst02ibmlagos + ZeroZeroFirst02ibmlagos) / 8192},
  {0.4 *  $\pi$ , (OneZeroFirst04ibmlagos + ZeroZeroFirst04ibmlagos) / 8192},
  {0.6 *  $\pi$ , (OneZeroFirst06ibmlagos + ZeroZeroFirst06ibmlagos) / 8192},
  {0.8 *  $\pi$ , (OneZeroFirst08ibmlagos + ZeroZeroFirst08ibmlagos) / 8192},
  {1.0 *  $\pi$ , (OneZeroFirst10ibmlagos + ZeroZeroFirst10ibmlagos) / 8192} }
```

ExpCosSqibmlagos = ListPlot[CosSqibmlagos]

ExpDecisivenessibmlagos = ListPlot[Decisivenessibmlagos]

Show[cstH, ExpCosSqibmlagos, PlotRange → All]

Show[decTH, ExpDecisivenessibmlagos]

Out[ ]= 2088

Out[ ]= 1157

Out[ ]= 4782

Out[ ]= 165

Out[ ]= 1995

Out[ ]= 1486

Out[ ]= 4475

Out[ ]= 236

Out[ ]= 1620

Out[ ]= 2640

Out[ ]= 3407

Out[ ]= 525

Out[ ]= 1193

Out[ ]= 3915

Out[ ]= 2159

Out[ ]= 925

Out[ ]= 882

Out[ ]= 4985

Out[ ]= 1103

Out[ ]= 1222

Out[ ]= 718

Out[ ]= 5404

Out[ ]= 676

Out[ ]= 1394

Out[ ]= 863

Out[ ]= 5008

Out[ ]= 1039

Out[ ]= 1282

Out[ ]= 1125

Out[ ]= 3931

Out[ ]= 2055

Out[ ]= 1081

Out[ ]= 1611

Out[ ]= 2570

Out[ ]= 3400

Out[ ]= 611

Out[ ]= 1880

Out[ ]= 1579

Out[ ]= 4423

Out[ ]= 310

Out[ ]= 2088

Out[ ]= 1157

Out[ ]= 4782

Out[ ]= 165

Out[ ]=  $\left\{ \left\{ -\pi, \frac{348}{1145} \right\}, \left\{ -2.51327, \frac{1880}{6303} \right\}, \left\{ -1.88496, \frac{1611}{5011} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{75}{212} \right\}, \left\{ -0.628319, \frac{863}{1902} \right\}, \left\{ 0., \frac{359}{697} \right\}, \left\{ 0.628319, \frac{882}{1985} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{1193}{3352} \right\}, \left\{ 1.88496, \frac{1620}{5027} \right\}, \left\{ 2.51327, \frac{399}{1294} \right\}, \left\{ \pi, \frac{348}{1145} \right\} \right\}$

Out[ ]=  $\left\{ \left\{ -\pi, \frac{3435}{4096} \right\}, \left\{ -2.51327, \frac{6303}{8192} \right\}, \left\{ -1.88496, \frac{5011}{8192} \right\}, \right.$   
 $\left. \left\{ -1.25664, \frac{795}{2048} \right\}, \left\{ -0.628319, \frac{951}{4096} \right\}, \left\{ 0., \frac{697}{4096} \right\}, \left\{ 0.628319, \frac{1985}{8192} \right\}, \right.$   
 $\left. \left\{ 1.25664, \frac{419}{1024} \right\}, \left\{ 1.88496, \frac{5027}{8192} \right\}, \left\{ 2.51327, \frac{3235}{4096} \right\}, \left\{ 3.14159, \frac{3435}{4096} \right\} \right\}$

