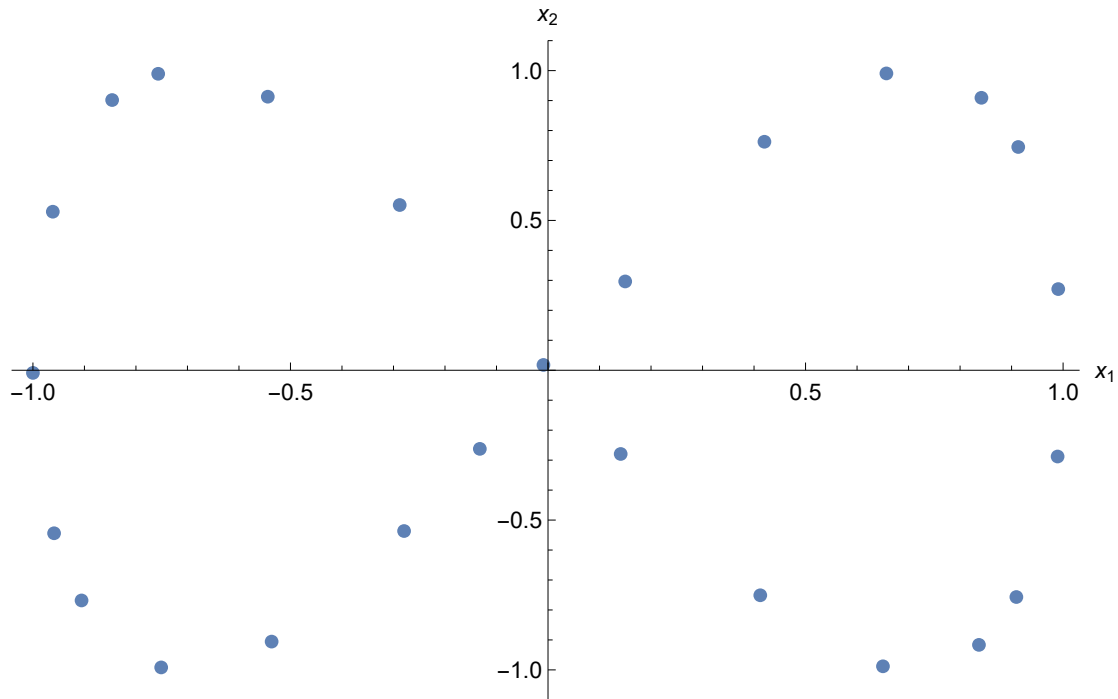


```

data2D = Table[{Sin[n], Sin[2 n]}, {n, 25}];
ListPlot[data2D, BaseStyle -> {FontSize -> 12},
  ImageSize -> Large, AxesLabel -> {"x1", "x2"}]

```



```

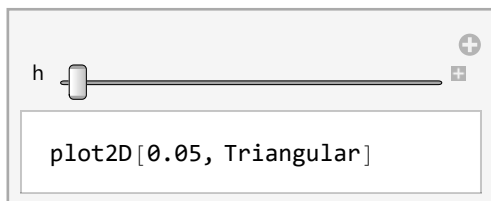
plot2D[h_, kernel_] :=
  Plot3D[Evaluate@PDF[SmoothKernelDistribution[data2D, h, kernel], {x, y}],
    {x, -1.5, 1.5}, {y, -1.5, 1.5},
    PlotRange -> Full,
    ImageSize -> Large,
    BaseStyle -> {FontSize -> 12},
    AxesLabel -> {"x1", "x2", "p̂(x1, x2)"},
    PlotLabel -> "h = " <> ToString[h],
    PlotPoints -> 50,
    ViewPoint -> {0, -2, 2},
    AxesEdge -> {{-1, -1}, {-1, 1}, {-1, -1}}
  ]

```

```

Manipulate[
  plot2D[h, "Triangular"]
  , {h, 0.05, 0.5}]

```



```

(*Do[
  Export[
    FileNameJoin[{
      NotebookDirectory[],
      "frames/kernels=" <> ToString[ { 0 kernels=="Gaussian"
                                       1 kernels=="SemiCircle" } <> "h=00.png"
                                       2 kernels=="Triweight"
      } ],
    Table[plot2D[h,kernels],{h,0.05,0.5,0.01}],
    "VideoFrames",
    Antialiasing->True
  ]
  ,{kernels,{"Gaussian","SemiCircle","Triweight"}}]*)

KNormal2D[x_] := PDF[MultinormalDistribution[{0, 0}, { 1 0
                                                       0 1 }], x]

plotKernel[kernel_] := Block[{K},
  K[x_, y_] :=
  {
    {
      {
        KNormal2D[{x, y]}
      }
      {
        {
          {

$$\frac{2\sqrt{1-x^2}}{\pi} \quad -1 < x < 1$$

          }
          {

$$\frac{2\sqrt{1-y^2}}{\pi} \quad -1 < y < 1$$

          }
          {

$$\frac{35}{32} (1-x^2)^3 \quad -1 < x < 1$$

          }
          {

$$\frac{35}{32} (1-y^2)^3 \quad -1 < y < 1$$

          }
          {

$$0 \quad \text{True}$$

          }
          {

$$0 \quad \text{True}$$

          }
          {

$$0 \quad \text{True}$$

          }
          {

$$0 \quad \text{True}$$

          }
        }
        *
        {
          {

$$\frac{2\sqrt{1-x^2}}{\pi} \quad -1 < x < 1$$

          }
          {

$$\frac{2\sqrt{1-y^2}}{\pi} \quad -1 < y < 1$$

          }
          {

$$\frac{35}{32} (1-x^2)^3 \quad -1 < x < 1$$

          }
          {

$$\frac{35}{32} (1-y^2)^3 \quad -1 < y < 1$$

          }
          {

$$0 \quad \text{True}$$

          }
          {

$$0 \quad \text{True}$$

          }
          {

$$0 \quad \text{True}$$

          }
          {

$$0 \quad \text{True}$$

          }
        }
      }
    }
  }
  kernel == "Gaussian"
  kernel == "SemiCircle"
  kernel == "Triweight"
;

  Plot3D[K[x, y], {x, -2, 2}, {y, -2, 2},
    PlotLabel -> kernel,
    PlotRange -> Full,
    ImageSize -> Large,
    BaseStyle -> {FontSize -> 12},
    AxesLabel -> {"x1", "x2", "p(x1, x2)"},
    ViewPoint -> {0, -2, 2},
    AxesEdge -> {{-1, -1}, {-1, 1}, {-1, -1}},
    Exclusions -> None
  ]
]

(*Do[
  Export[
    FileNameJoin[{
      NotebookDirectory[],
      "frames/kernel=" <> ToString[ { 0 kernel=="Gaussian"
                                       1 kernel=="SemiCircle" } <> ".png"
                                       2 kernel=="Triweight"
      } ],
    plotKernel[kernel],
    "VideoFrames",
    Antialiasing->True
  ]
  ,{kernel,{"Gaussian","SemiCircle","Triweight"}}]*)

```