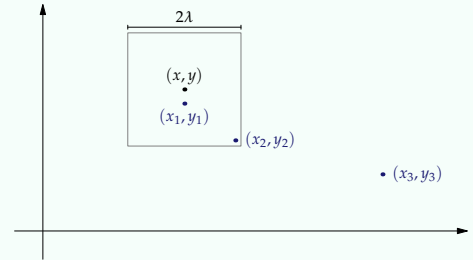


DATA 1010
IN-CLASS EXERCISES
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Problem 1

Put the values $K_\lambda(x_1 - x, y_1 - y)$, $K_\lambda(x_2 - x, y_2 - y)$, $K_\lambda(x_3 - x, y_3 - y)$ in order from least to greatest.

Recall that $K_\lambda(x, y) = D_\lambda(x)D_\lambda(y)$ where $D_\lambda(x) = \frac{70}{81\lambda} \left(1 - \frac{|x|^3}{\lambda^3}\right)^3$.



Problem 2

Suppose we have a probability density function f on a rectangle in \mathbb{R}^2 , and we compute its values on a fine-mesh grid of points along a vertical line at position x through the rectangle and store those values in a vector v . Suppose that the y -coordinates of the grid points are stored in a vector ys .

Write a line of Julia code to approximate the conditional expectation of Y given $X = x$, if (X, Y) has PDF f .

Problem 3

How many of the samples in the figure shown have a nonzero contribution to the integral representing the conditional expectation of Y given $X = x$? (The heatmap shows the joint density of X and Y .)

