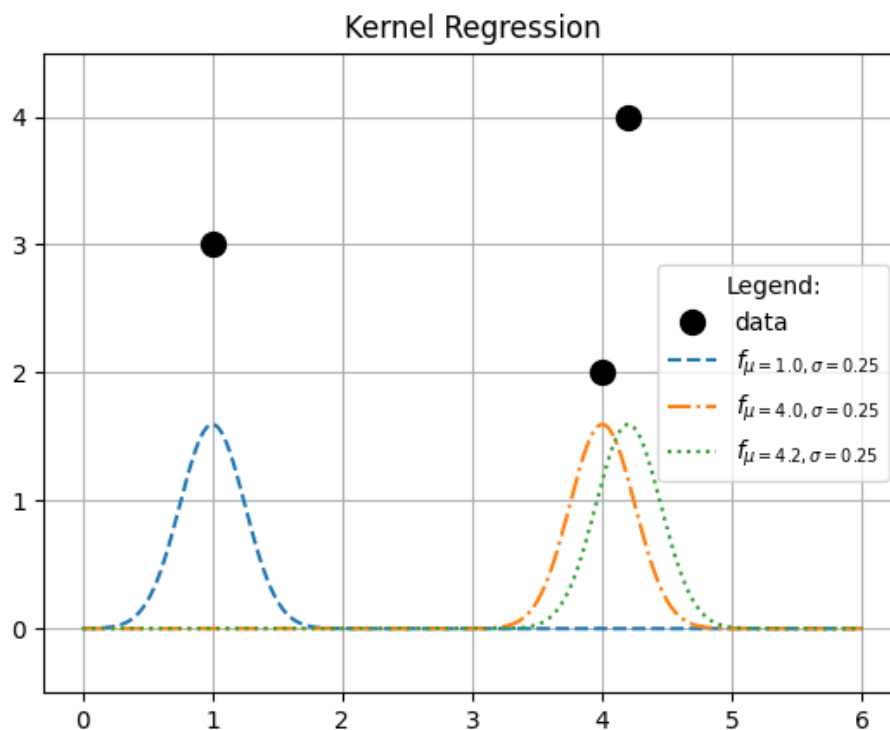


GroupH Practice

1. Here is a graph of $\{(\mathbf{x}_i, y_i)\} = \{(x_i, y_i)\} = \{(1, 3), (4, 2), (4.2, 4)\}$ (each $\mathbf{x}_i$ is 1D) along with corresponding Gaussian curves $\{f_{\mu=x_i, \sigma=b}(x)\}$ made with bandwidth $b = 0.25$:



- (a) Use kernel regression to estimate $y = f(x)$ for $x = 4.1$.

Based on the plot, the estimate is $\hat{y} \approx$.

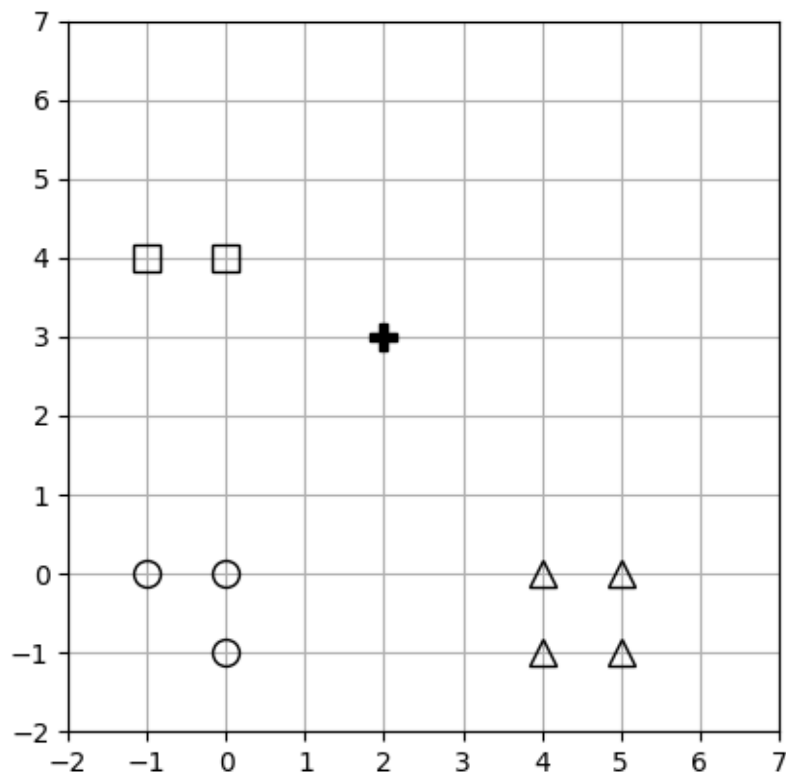
- (b) Estimate $y = f(x)$ for $x = 1$.

Based on the plot, the estimate is $\hat{y} \approx$.

- (c) On the figure above, draw the estimated regression function over the interval $[0, 6]$. Hints:

- Use your $\hat{y}$ estimate at $x = 1$.
- The weights are approximately constant over $x \in (-\infty, \approx 2.5)$, which includes $x = 1$.
- Just right of ≈ 2.5 , the dash-dot curve dominates.
- Use your $\hat{y}$ estimate at $x = 4.1$.
- Moving further right shifts weight from the dash-dot curve to the dotted curve, which dominates as $x \rightarrow \infty$.
- (This question is a little too painful. Try to learn from it anyway.)

2. Consider a one-vs.-rest linear SVM classifier trained on the following data depicted by circles, squares, and triangles:



(a) On the graph above, draw the three binary classifiers required by this method.

(b) How does this classifier classify the point indicated by “+”?

_____ circle
_____ square
_____ triangle

(c) Which category is ranked second by this classifier’s decision method for the “+”?

_____ circle
_____ square
_____ triangle