6.S091 Problem Set 2

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6.S091: Causality

January 24, 2023

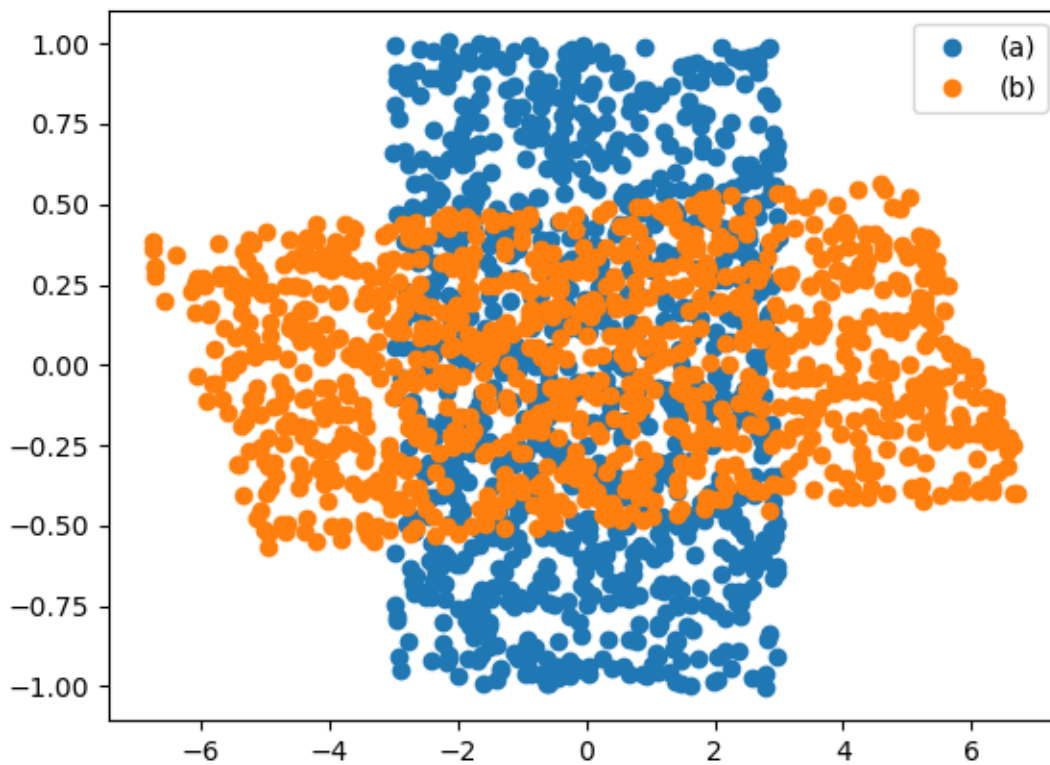## Problem 1

Plotting Regression Residuals

(a)

$\hat{\beta}_{12} = 2.0032613606359835$

(b)

$\hat{\beta}_{21} = 0.4853818665988653$

Causal Direction Inference

(c)

The plot explains the relationship between ε_1 and ε_2. Since $\varepsilon_1 \perp\!\!\!\perp \varepsilon_2$, we have to choose the SCM which shows such independence. Therefore, the data is more likely to be generated from SCM M^a.

Problem 2

Partial correlation

(a)

$\widehat{\rho}(X_1, X_4, \varnothing) = 0.18515108160562416$

(b)

$\widehat{\rho}(X_1, X_4, \{X_2, X_3\}) = 0.0093340865561515$

(c)

$\widehat{z}(X_1, X_4, \{X_2, X_3\}) = 0.9332023767104407$