Weekly Practice 3

FILL IN YOUR NAME

Pedagogical Purpose

The point of this Weekly practice is to walk through the CACE Theorem.

Part A

Build a data frame according to the following specifications

N a column of units. There should be 100.

YiD0 a potential outcome under control. This should be the same length as N from a standard normal distribution.

YiD1 a potential outcome under treatment. This should be a constant effect of 5.

diZ0 This is the potential outcome given treatment is never received. For all units, it should be the same number that we use to represent no treatment.

diZ1 This is the status for units who are compliers. Use complete random assignment and put 30% of units in treatment.

Type This is a dummy variable indicating whether a unit is a complier or a NT. If a unit is a complier, this is equal to 1, else this is equal to 0.

Part B

Identify the ITT_D which is $E[d_i(z = 1) - d_i(z = 0)]$.

Identify the ITT which is $E[Y_i(z = 1, d(1))] - E[Y_i(z = 0, d(0))]$

Part C

Identify the CACE which is the ratio of the ITT relative to the ITT_D

Part D

Turn your work from parts B and C into a function called CACE. This function should take in a data frame with appropriate columns and return the CACE.

Show your function works by passing the created dataset. You should get the same answer as Part C if your function is correct.