An average of B i.i.d. random variables, each with variance σ^2, has variance $\frac{1}{B}\sigma^2$. If the variables are simply i.d. (identically distributed, but not necessarily independent) with positive pairwise correlation ρ, the variance of the average is (Exercise 15.1)

$$\rho\sigma^2 + \frac{1-\rho}{B}\sigma^2. \tag{15.1}$$

Ex. 15.1 Derive the variance formula (15.1). This appears to fail if ρ is negative; diagnose the problem in this case.

15.1 식의 증명만 하시면 됩니다!