

THE FRIEDMAN TEST: Randomized Block Design

Assumptions:

1. The treatments are randomly assigned to experimental units within the blocks
2. The measurements can be ranked within blocks, and
3. The k probability distributions are continuous.

Block	Treatments					
	A	Rank	B	Rank	C	Rank
1	6.1	1	7.2	2	9.3	3
2	4.2	2	4.1	1	5.2	3
3	7.5	1	7.8	2	8.1	3
4	10.1	1.5	10.1	1.5	10.5	3
5	8.4	1	9.1	2	9.6	3
6	7.8	1	8.4	3	8.0	2
	$R_1 =$	7.5	$R_2 =$	11.5	$R_3 =$	17

Step 1

H₀: The probability distributions of the 3 treatments are identical

H_a: At least two of the 3 probability distributions differ in location

Step 2

Calculate the test statistic

$$b = 6$$

$$k = 3$$

$$F_r = \frac{12}{b \cdot k (k+1)} \sum R_i^2 - 3b (k+1)$$

$$= \frac{12}{6 \cdot 3 (3+1)} (7.5^2 + 11.5^2 + 17^2) - 3 \cdot 6 (3+1)$$

$$= 7.583$$

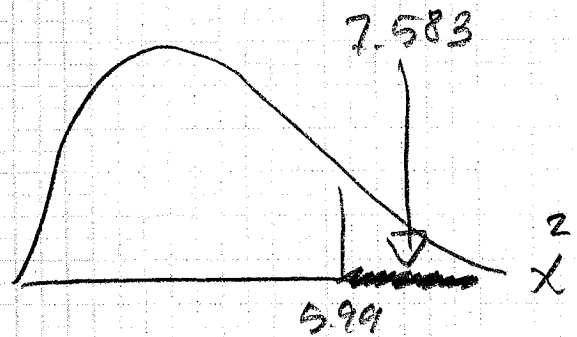
Step 3 Rejection Region

$$df = k - 1 = 3 - 1 = 2$$

$$\alpha = .05$$

$$RR: \chi^2 > \chi^2_{.05, 2}$$

$$\chi^2 > 5.99$$



Step 4 Decision: Reject H_0

Step 5 Conclusion: "The data provide sufficient evidence, at $\alpha = .05$, to conclude that at least two of the three probability distributions differ in location."