

1. Let X_1, X_2, \dots, X_n be independent identically distributed random variables with cumulative distribution function

$$F(x) = \begin{cases} 1 - 1/x^2 & \text{if } x \geq 1 \\ 0 & \text{if } x < 1. \end{cases}$$

Find the limiting distribution of $\frac{X_{n:n}}{n^{1/2}}$.