Q3

1 Point

Suppose the $1-\alpha/2$ quantile of an $F_{p,q}$ distribution is 5. What is the $\alpha/2$ quantile of an $F_{q,p}$ distribution? Show details.

$$f_{1-\alpha}(p,q) = 1/f_{\alpha}(q,p)$$

$1-\alpha$ quantile of F_{pq} ; α quantile of F_{qp}

$$\Rightarrow \quad f_{\alpha}(q,p) = 1/5 \quad \text{※}$$

Details:

$$\alpha = P(X \le f_{\alpha}(p,q))$$
$$= P(1/X \ge 1/f_{\alpha}(p,q))$$
$$= 1 - P(1/X \le 1/f_{\alpha}(p,q))$$

(Since $F_{pq} = \frac{U/p}{U/q}$, so $F_{qp} = \frac{U/q}{U/p} = 1/F_{pq}$)

$$= 1 - P(F_{qp} \le 1/f_{\alpha}(p,q))$$
$$= 1 - F_{qp}(1/f_{\alpha}(p,q))$$
$$\Rightarrow 1-\alpha = F_{qp}(1/f_{\alpha}(p,q))$$
$$f_{1-\alpha}(q,p) = 1/f_{\alpha}(p,q)$$