

STAT 712 hw 8

Random samples, Normal-population pivot quantities

Do problems 5.8(a), 5.10, 5.12, 5.13, 5.16, 5.17(b,c,d) from CB. In addition:

1. Let $W \sim \chi_{\nu}^2(\phi)$, so that W has the non-central chi-squared distribution with degrees of freedom $\nu > 0$ and non-centrality parameter $\phi > 0$. The pdf of W is given by

$$f_W(w; \nu, \phi) = \sum_{k=0}^{\infty} \frac{e^{-\phi/2} (\phi/2)^k}{k!} \frac{1}{\Gamma(\frac{\nu+2k}{2}) 2^{\frac{\nu+2k}{2}}} w^{\frac{\nu+2k}{2}-1} e^{-w/2} \mathbf{1}(w > 0).$$

- (a) Find the mgf of W .
 - (b) Let W_1, \dots, W_q be independent rvs such that $W_j \sim \chi_{\nu_j}^2(\phi_j)$ for $j = 1, \dots, q$. Find the mgf of $V = W_1 + \dots + W_q$ and identify the distribution to which it belongs.
2. (Optional) Additional problems from CB: 5.8 (b)(c), 5.11