Example 5.6 (Constructing Bonferroni simultaneous confidence intervals and comparing them with T^2-intervals) Let us return to the microwave oven radiation data in Examples 5.3 and 5.4. We shall obtain the simultaneous 95% Bonferroni confidence intervals for the means, μ_1 and μ_2, of the fourth roots of the door-closed and door-open measurements with $\alpha_i = .05/2$, $i = 1, 2$. We make use of the results in Example 5.3, noting that $n = 42$ and $t_{41}(.05/2(2)) = t_{41}(.0125) = 2.327$, to get

$$\bar{x}_1 \pm t_{41}(.0125)\sqrt{\frac{s_{11}}{n}} = .564 \pm 2.327\sqrt{\frac{.0144}{42}} \quad \text{or} \quad .521 \leq \mu_1 \leq .607$$

$$\bar{x}_2 \pm t_{41}(.0125)\sqrt{\frac{s_{22}}{n}} = .603 \pm 2.327\sqrt{\frac{.0146}{42}} \quad \text{or} \quad .560 \leq \mu_2 \leq .646$$

Figure 5.4 shows the 95% T^2 simultaneous confidence intervals for μ_1, μ_2 from Figure 5.2, along with the corresponding 95% Bonferroni intervals. For each component mean, the Bonferroni interval falls within the T^2-interval. Consequently, the rectangular (joint) region formed by the two Bonferroni intervals is contained in the rectangular region formed by the two T^2-intervals. If we are interested only in the component means, the Bonferroni intervals provide more precise estimates than