Fundamentals of Data Analysis: Assignment #9

Deadline: 12/15/2003 (Monday)

Please post to the mailbox next to the IS management office (2nd floor of IS building)

1. In order to test whether a new drug for individuals suffering from high blood pressure has a side effect, a random sample of 12 patients are selected from a large number of such patients. Tests of the side effect are administered to those patients both before and after they received the drug. The following table gives the scores. Run a statistical test on the side effect. Use α (significance level) = 0.01.

patient index:	1	2	3	4	5	6	7	8	9	10	11	12
before:	10	14	5	6	9	15	1	20	10	2	7	10
after :	5	9	7	3	10	15	4	16	12	5	3	6

2. A researcher examines the effect of a drug on the weight of a certain animal. He hypothesized that taking the drug reduces the variance of weights of the animal. It is already known that the mean and variance of the animal which does not take the drug are 15 Kg and 5.2Kg^2, respectively. He gave this drug to 16 samples of the animal, and measured their weights. The estimated mean and variance from 16 samples were 18Kg and 3.6Kg^2, respectively. Test the hypothesis using α = 0.05.

3. You observed 25 samples from a population obeying a Normal distribution whose variance is unknown. The estimated variance from the sample was 36. Calculate the confidence interval of the true variance. Set the confidence level 0.9.

4. A researcher would like to compare the variance of the score of mathematics between the population of all high-school students who are currently enrolled in the new program, and the population of all high-school students who completed the old program. You sampled subjects from both populations and collected data whose summary is shown below. Examine whether the variances are significantly different or not, assuming the both parent populations are normally distributed.

Old program:	sample number 31,	estimated variance 16
New program:	sample number 30,	estimated variance 3

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5. A researcher would like to determine whether there is a difference in the variability of IQ scores between fathers and their first sons. 20 fathers were selected randomly from the population of all fathers with a first-born son. Both fathers and sons were given the same standard IQ test. The results in father-son pairs were as follows:

#	Father	Son	#	Father	Son	#	Father	Son	#	Father	Son
1	110	113	6	85	90	11	92	95	16	103	105
2	95	102	7	120	119	12	87	92	17	138	145
3	115	110	8	122	112	13	132	125	18	142	120
4	90	96	9	105	109	14	117	120	19	105	95
5	100	97	10	97	95	15	98	100	20	135	140

Test the hypothesis of equal variance at significance level a = 0.01. Assume that both parent populations are normally distributed.

6. Write your comments and requests on this lecture (if any).

END.