Stat 8680: Applied Nonparametric Methods

Assignment 3

1. **Problems 6.4 (Page 192)**

2. **Apply the Kolmogorov – Smirnov test for different populations to the oven cooling data in Problems 6.4.**

3. **Problems 6.7 (Page 192)**

4. **Problems 6.8 (Page 192)**

scores if these are based on the mean of the van der Waerden scores corresponding to rank 2 and to rank 3. Carry out a similar comparison if there were ties for ranks 10, 11 and 12.

*6.4 Hotpot stoves use a standard oven insulation. To test its effectiveness they take random samples from the production line and heat the ovens selected to 400°C, noting the time taken to cool to 350°C after switching off. For a sample of 8 ovens the times in minutes are:

15.7 14.8 14.2 16.1 15.3 13.9 17.2 14.9

They decide to explore a cheaper insulation, and using this on a sample of 9 the times taken for the same temperature drop are:

13.7 14.1 14.7 15.4 15.6 14.4 12.9 15.1 14.0

Are the firm justified in asserting there is no real evidence of a different rate of heat loss? Obtain a 95 percent confidence limit for the difference in median heat loss (a) with and (b) without a normality assumption. Comment critically on any differences between your conclusions.

6.5 A psychologist wants to know whether men or women are more upset by delays in being admitted to hospital for routine surgery. He devises an anxiety index measured on patients 1 week before scheduled admission and records it for 17 men and 23 women. These are ranked 1 to 40 on a scale of increasing anxiety. The sum of the ranks for the 17 men is 428. Is there evidence that anxiety is gender-dependent? If there is, which gender appears to show the greater anxiety?

*6.6 Suppose we are given the data for response times in LVF and RVF in Table 5.1, but the information that they are paired is omitted. In these circumstances we might analyse them as independent samples. Would we then conclude that responses in the two fields differed? Does your conclusion agree with that found in Example 5.1? If not, why not?

6.7 Hill and Padmanabhan (1984) give body weights (g) of diabetic and normal mice. Is there evidence of a significant difference in mean body weight? Obtain the Hodges–Lehmann estimate of the difference together with a 95 percent confidence interval. Compare this interval with that based on the t-distribution.

Diabetic	42	44	38	52	48	46	34	44	38				
Normal	34	43	35	33	34	26	30	31	27	28	27	30	37
	38	32	32	36	32	32	38	42	36	44	33	38	

*6.8 The journal *Biometrics* published data on the numbers of completed months between receipt of a manuscript for publication and the first reply to the authors for each of the years 1979 and 1983. The data are summarized below. Is there evidence of a difference in average waiting times between 1979 and 1983?

Completed months	*0*	*1*	*2*	*3*	*4*	*5*	*6*
1979	26	28	34	48	21	22	34
1983	28	27	42	44	17	6	16

EXERCISES

*6.9 The data below are r
200-word sample passages fr
Society by W.F. Bodmer (19
of a difference between the a

Number of l	
Bodmer	
Durbin	

6.10 Carter and Hubert (1
over 1–hour periods for each
of a drug. Is there evidence o

Dose I	0.2
	1.9
Dose II	1.5
	7.2

6.11 The following data are I
dental students. The DMF sc
+ filled teeth.

M	8	6	4	2	10	
	1	8	2	0	7	
F	4	7	13	4	8	
	4	8	8	4	11	
	4	10	7	8	8	
	10	3	8			

Use an asymptotic WMW te
nificantly between males and
appropriate test statistic?

6.12 Lindsey, Herzberg and
second tarsus for two species o
differences between the width

Species A	131	134
Species B	107	122

*6.13 Perform a Siegel–Tuke
set of sample values to align t