Department of Statistics

COURSE STATS 330

Assignment 2, 2003

Instructions: Hand in your completed assignment to the Student Resource Centre by 4pm on Thursday 21st August.

The data overleaf are measurements made on 128 male deer captured in the Ruahine Ranges in the North Island of New Zealand. For each deer, the age in months, the weight in kg and the jaw length in mm are all measured.

The aim of the data collection was to develop a simple method of estimating the age of a deer using the weight and jaw measurements, which are easily made. (Determining the age of a deer is difficult.)

The variables are

Age:	age in months
Jaw:	length of jaw (mm)
Weight:	(kg)

The data (in the form of a text file) are available on the course web page under the title deer.txt.

1. Fit a regression model to the data, using age as the response. Then, having fitted the model, examine the fit for
   - Non-planar regression
   - Non-constant variance
   - Outliers and high-leverage points
   - Lack of normality

   Make a list of the defects in the fit that you have found. Show any plots used, together with the code used to produce them.

2. Find a suitable transformation that will cure (or at least partially cure) the defects you listed in 1. Document the reasoning that led you to your transformation.

3. Use the model you have developed in Questions 1 and 2 to predict the age of a deer that weighs 60 kg and has a jaw length of 200 mm.

Data are listed overleaf.

age	weight	jaw	age	weight	jaw	age	weight	jaw
10	36	226	17	62	256	30	53	265
10	45	254	17	53	247	30	82	293
10	43	252	17	70	267	30	76	278
10	37	224	17	44	239	36	51	262
10	47	254	17	48	243	36	55	257
10	43	247	17	53	262	36	68	283
10	56	273	18	55	157	36	46	253
10	43	231	18	62	268	36	76	289
10	34	219	22	62	267	37	79	287
10	41	226	22	38	245	37	81	284
10	47	245	22	57	273	37	76	301
10	45	252	22	55	256	37	86	282
10	44	249	22	43	244	37	72	260
10	34	219	22	60	270	38	85	292
11	32	214	22	52	257	38	41	275
11	46	247	22	63	269	41	93	290
11	36	232	22	55	233	41	83	294
11	35	226	22	63	276	42	85	308
11	35	211	22	54	267	46	84	291
11	29	216	23	48	258	46	89	301
11	29	218	23	48	253	46	70	293
11	43	232	23	55	229	48	88	300
11	40	235	23	53	253	48	73	280
11	21	202	23	64	272	48	72	285
11	53	253	23	50	262	51	77	264
11	32	211	23	54	270	51	71	291
11	36	211	23	50	267	51	38	272
11	42	236	24	67	277	53	82	284
12	40	230	24	82	293	54	89	292
12	49	243	24	42	254	54	89	298
13	46	240	24	57	259	54	92	303
14	33	217	26	57	283	58	80	290
14	57	257	26	40	245	60	75	280
14	47	236	26	41	225	60	67	279
14	48	257	26	41	225	62	81	265
14	48	234	26	56	262	65	101	311
15	44	227	27	71	282	66	73	288
15	52	252	27	75	277	72	87	290
16	57	249	27	77	229	78	91	287
16	66	279	29	67	275	94	73	292
16	45	247	29	74	287	97	65	258
16	43	237	30	95	296	106	97	360
17	58	273	30	85	281			