MS Module 8: Paired data and Two Population Proportions & Variances (overview)

(The attached PDF file has better formatting.)

Reading: §10.3: Analysis of paired data

Some actuarial scenarios have paired data, such as mortality rates for a husband and wife or motor insurance accident frequencies for a husband and wife if both are insured under the policy.

The arithmetic is simpler for paired data than for unpaired data. The textbook discusses the qualitative issues regarding use of paired vs unpaired procedures. Paired data are often positively correlated, as may be true for mortality rates and average claim frequencies.

Reading: §10.4: Inferences About Two Population Proportions

The variance of a proportion depends on the mean: variance = n × p × (1 – p), so the variance of the mean = p × (1 – p) / n. For large samples, the Z statistic has

- estimated proportions in each sample for the numerator and
- the estimated proportion in the combined sample for the denominator.

Final exam problems may test α (probability of a Type I error), β (probability of a Type II error) at a given point, the sample size needed for a given α and β (at a given point), and confidence intervals.

Reading: §10.5: Inferences About Two Population Variances

Inferences regarding differences of the variances of two samples use *F* tests. The confidence intervals use a critical *F* value on one side and the reciprocal of a critical *F* value on other side. The *F*-statistic is the ratio of the sample variances, which depends on which sample is the numerator and which is the denominator. The reciprocal of the *F*-statistic reverses the samples in the numerator and the denominator.

§10.6 Comparisons Using the Bootstrap and Permutation Methods is not on the syllabus for this course.