CHANGES TO THE SYLLABUS AND CORE READING FOR SUBJECT CT3 FOR THE 2009 EXAMINATIONS

Changes to the Syllabus and their impact on Core Reading

There have been no changes to the Syllabus.

Changes to Core Reading

UNIT 1

Section 5

A new section 5.2 has been added as follows:

5.2 Measuring skewness for data

One particular measure of skewness is based on the third moment about the mean

$$\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^3 .$$

The coefficient of skewness is a scaled version of this moment obtained by dividing it by the second moment about the mean raised to the power 3/2. Note that this does not depend on the units of the data and is such that its sign reflects the skewness with a value of zero corresponding to a symmetric set of data. Further detail can be found in Unit 3.

UNIT 3

Section 3

A new section 3.5 has been added as follows:

3.5 Other quantities

Just as with data, there are other quantities which summarise features of a distribution. For example an alternative to the mean is the median defined for any random variable X as m, such that

$$P(X < m) \le 0.5 \le P(X \le m) .$$

In particular, if X is continuous the median m is defined as the solution of

$$\int_{-\infty}^{m} f_x(x)dx = 0.5 .$$

Similarly quartiles can also be defined in an obvious way.

UNIT 11

Section 1

The following paragraph has been added at the end of this section:

The power of a test is the probability of rejecting H_0 when it is false, so that the power equals $1 - \beta$. For simple hypotheses the power is a single value, but for composite hypotheses it is a function being defined at all points in the alternative hypothesis.

Section 2.1

The first paragraph of this section has been amended to:

The classical approach to finding a "good" test (called the Neyman-Pearson theory) fixes the value of α, i.e. the level of significance required and then tries to find such a test for which the other error probability, β, is as small as possible for every value of the parameter specified by the alternative hypothesis. This can also be described as finding the "most powerful" test.

The fourth paragraph of this section has been amended to:

Common tests are often such that the null hypothesis is simple, e.g. $H_0 : \theta = \theta_0$, against a composite alternative, e.g. $H_1 : \theta \neq \theta_0$, which is two-sided, and $H_1 : \theta > \theta_0$ or $H_1 : \theta < \theta_0$, which are one-sided. Here it is only in certain special cases (usually one-sided cases) that a single test is available which is best (ie uniformly most powerful) for all parameter values. In cases where a single best test in the sense of the Neyman–Pearson Lemma is unavailable, another approach is used to derive sensible tests. This approach, which is a generalisation of the Lemma, produces tests which are referred to as likelihood ratio tests.

The only other changes that have been made to the Core Reading are to correct typographical errors and improve the style.

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