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Regression Modelling

REGRESSION MODELLING

The third part of this lab course comprises Sessions 11 to 14, which will enable you to develop the practical skills for performing regression analysis using MS Excel 2007. In lab sessions of Part A, you have learnt how to construct the control charts for variables, which are used to control the process when the quality characteristic is **measured** numerically. You have also learnt how to construct the control charts for attributes in Part B. As you know, these charts are used to control the process when the number of defectives or defects are **counted**.

In Block 3 of MSTE-002 (Industrial Statistics-II), you have learnt that regression analysis is one of the most important and widely used tool for analysing multivariate data in statistical data analysis. Using regression analysis, you can fit a mathematical relationship between the variable under consideration and other associated variables. You can also use this relationship to predict the values of the variable under consideration called response variable on the basis of associated variables called predictors or regressors. In the lab sessions of Part C, you will learn the technique of regression analysis through illustrative examples using MS Excel 2007.

In Session 11, you will learn how to **fit a simple linear regression model** to **predict** a response variable based on the predictor. We also elaborate on the **inferential analysis** of the regression coefficient, **normal probability plot**, **residual analysis**, etc., in this session.

It is always beneficial to use more than one predictor, which contributes to the model to build a regression model. Session 12 deals with the situation where you have **more than one predictor**.

In many studies, you may also come across situations when one or more predictor variables are **qualitative**. For example, sex (male/female), promotional activity (Yes/No), etc. Such a situation is handled in Session 13 through an example. In Session 14, we explain three variable selection methods, namely, **forward selection**, **backward elimination** and **stepwise methods**, which enable us to choose the most appropriate variables for the regression model.

All sessions of this part have been designed in such a way that after successfully completing them, you will be familiar with a mathematical relationship between the response variable and one or more predictor variables and its related analysis using MS Excel 2007. You will also be able to apply the regression technique for any given data.

You should study Block 3 of MSTE-002 thoroughly before performing the activities of the lab sessions of Part C. In this part, we shall apply all concepts and formulae explained in Block 3 of MSTE-002.