



Application of Computational Tools for Performance Prediction of Gasoline Engine Fuelled with Ethanol Gasoline Fuel Fractions

Publisher: IEEE

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Abstract:

With faster depletion of natural sources of petroleum fuels, it becomes essential to use alternative fuels. Ethanol is growingly becoming best choice as fuel fraction to blend with gasoline. These fuel fractions are planning to be used with higher percentages of ethanol. It is highly required to find the best possible fuel fractions and performance of the engine under different operating conditions. The present study proposes applications of Minitab 17 and XLSTAT for establishing the relationship of dependent parameters with each independent parameter. Minitab 17 is used for multiple regression and provides mathematical equations for each dependent variable in terms of operating independent variables. Minitab 17 is also used for plotting the contour graphs, which shows the regions of best and poor levels of each dependent parameter on graph through contours and shaded areas. These applications of Minitab 17 are used for performance prediction and finding optimum conditions of engine. XLSTAT is add-on tool to be used in MS-Excel. It provides graphical tools for finding the errors in the model developed. It also gives the dominance of each operating parameter with engine output parameters. Both tools can be effectively used for developing customised mathematical relations. Semi-empirical mathematical relations are simple to form and accurate to predict the engine performance.