

where W_{x1} , W_{x2} , W_{x3} , ... are the uncertain or errors in the independent variables and WR is the error in the results. To find the value of uncertainty percentage:

$$\text{Percentage analysis} = W_R/R * 100\%$$

Using the above mentioned equations it was found that the minimum and the max torque uncertainties are 1.95% and 2.13% respectively.

4. CONCLUSIONS

The results of the test can be concluded as follows:

- The performance of the electrolyzer depends on the electrolyte concentration; as it increases, time required for HHO gas to replace water in a test decreases, which leads to an increase in the gas flow rate.
- At low speed operation, it was noticed that a low HHO flow rate will lead to a better engine performance, and that is because of the higher volumetric efficiency which allows more HHO gas to enter the cylinder, while at high engine speeds, a high HHO flow rate is needed to maximize the engine performance due to a reduced volumetric efficiency.
- The enhancement in performance of the engine with the addition of HHO is noticed to be higher at lower dynamometer speeds compared to high dynamometer speeds.
- In the variable dynamometer speed operation, it was observed that the addition of HHO gas will cause a notable reduction in the BSFC, an increase in the brake thermal efficiency, while the power and torque remain constant.

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