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LOCAL GEOID MODEL OVER PERLIS REGION USING  
GEOMETRICAL APPROACH

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SCHOOL OF GEOMATICS SCIENCE AND NATURAL RESOURCES  
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**Thesis submitted to the Universiti Teknologi MARA Malaysia  
in partial fulfilment for the award of the degree of the  
Bachelor of Surveying Science and Geomatics (Honours)**

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## AUTHOR'S DECLARATION

I declare that the work on this project/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA (UiTM). This project/dissertation is original, and it is the result of my work, unless otherwise indicated or acknowledged as referenced work.

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## ABSTRACT

This study addresses the challenge of limited high-quality elevation data in Perlis, Malaysia, by creating a geoid model using a geometrical approach that combines GNSS and leveling data. This study provides the new approach to benefit CRM points distribution by transferring the MSL to each point in Perlis Region. Researchers employed data from 38 GNSS leveling points and 3725 CRM points to develop the model. Five gridding methods such as kriging, polynomial, inverse distance to power, nearest neighborhood, and moving average were tested using 21 GNSS levelling points observed with Network RTK method. Among these methods, the polynomial method proved to be the most accurate, with an RMSE of 0.056 meters, while the moving average method was the least accurate, with an RMSE of 0.268 meters. Additionally, the existing Malaysian hybrid geoid model (MyGeoid) was evaluated using the same GNSS levelling points and showed a slightly lower accuracy with an RMSE of 0.076 meters. The findings suggest that the polynomial method is optimal for geoid modelling in this region, providing a more accurate representation than the existing MyGeoid model with 2cm differences.

**Keywords;** Geometrical Geoid Model, Vertical Datum, Mean Sea Level, Geoid, GPS, RMSE

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