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Statistical-based Tuning of Ericsson Model Parameters Employing Robust LAD Algorithm for Improved Radio Frequency Propagation Loss Prediction.

Improving the prediction capability of propagation models by means of their parameter tuning with robust field test measurement has been a dynamic area of research in literature, but mostly using the least square (LS) tuning approach. One major drawback of propagation model parameter tuning using standard LS method is that it requires varying and incrementing one parameter repeatedly in steps up to 2 to 4 times, before attaining a near global minimum. In this paper, a better approach tagged Adaptive least absolute deviation (ALAD) is proposed to robustly tune the offset parameters of Ericsson model to accurately map field measurement. The optimal prediction of the proposed ALAD tuning algorithm over the LS tuning approach have been demonstrated on measured loss data acquired over two different cell sites locations of a recently deployed LTE radio cellular network in Port Harcourt. In terms of the mean percentage error and coefficient of efficiency. The outcome in study locations show that prediction accuracy attained using the tuned Ericsson model with the LAD algorithm outperform the conventional LS tuning technique by 20%, 19 % , 24% and 22%, 25 % , 21% on the measured LTE propagation loss data, in term of root mean square error, mean absolute percentage error and correlation coefficient respectively in the study two locations.

Keywords: Propagation loss, Propagation Model tuning, prediction accuracy, Least Absolute deviation regression, least square regression.

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