National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Systematic Optimization Of Passive Circuits Using EM Solver
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Venue	: EE401
Date and Time	: 31 Jul 2025 (5:30)
Abstract	: This work presents a comprehensive full-wave simulation study of a conventional transmission line, its equivalent symmetric T-structure, and a coupled transmission line using the MATLAB RF PCB Toolbox. The performance of each structure is analysed and compared with the desired theoretical results. For the conventional transmission line, it is observed that while single-band operation performs well, dual-band or multi-band configurations suffer from increased radiation and conduction losses, limiting their practical utility. To address this, an equivalent symmetric T-structure is designed, and its behaviour under single-band and dual-band operation is investigated. The T-structure exhibits excellent agreement with the conventional transmission line in the single-band regime and provides acceptable trade-off performance for dual-band operation, thereby validating its equivalency. Additionally, the coupled transmission line is simulated for coupling coefficients (-13 dB, and -40 dB) on a substrate with a dielectric constant of 4.4. The behaviour of the coupled transmission line is analysed both with and without accounting for the even- and odd-mode electrical lengths. It is observed that significant ambiguities arise when the electrical lengths in both modes are assumed to be constant. Therefore, this assumption cannot be considered reliable under strong coupling conditions. The results offer valuable insight into the electrical behaviour and practical viability of these transmission line structures across various configurations.