In this contribution it is investigated, how a metamaterial structure with a finite number of repeated cells can be analyzed efficiently using analytic properties. The method of lines (MoL) is utilized, which is a semi-analytical method. As the propagation in propagation direction is described analytically, Floquet's Theorem can be used to transform the field at input and output of one cell into a set of Floquet modes. The propagation of the Floquet modes throughout the structure consisting of N periods can easily be calculated by the resulting phase difference. Thus the computation time is independent from the number of periods. With increasing number of periods the MoL becomes more and more competitive compared to commercial tools, where the computation time increases with higher number of periods. Results for a metamaterial CRLH transmission line are presented and compared with results obtained by commercial tools and measured results from literature.

Stichworte: cells; electromagnetic, CRLH, line; Floquet, lines; , lines; microstrip, lines; repeated, lines; transmission, modes; MoL; analytic, of, propagation; metamaterials; method, properties; metamaterial, structure; method, transmission, wave
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