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Transmission properties of a Fibonacci quasi-crystals containing single-negative materials and their usage as multi-channel filters ALI CHARKHESHT, University of Tabriz, Tabriz, Iran - Virginia Polytechnic Institute and State University, Blacksburg, Virginia, HAMID PASHAEI ADL, SAMAD ROSHAN ENTEZAR, University of Tabriz, Tabriz, Iran — One of the interesting phenomena appearing in Fibonacci quasi-crystals is wave localization, so that the field becomes spatially confined in some suitable regions, or delocalized in some other parts. Many theoretical works have been written on this interesting subject. The periodic Fibonacci structure properties lead to a transmission spectrum that exhibits some band gap, and it is possible to control these band gaps by the generation number of this structures. All these properties make Fibonacci quasi-crystals materials very attractive from an optical point of view. Accordingly, the transmission properties of Fibonacci quasi-crystals containing single-negative materials are investigated with the transfer matrix method. It is shown that the periodic structures created by repeating the Fibonacci quasi-crystal generations, have some omnidirectional band gaps at the single-negative frequency region. Moreover, it is shown these band gaps depends on the number of Fibonacci photonic crystal unit cell. In other words, when generation number of Fibonacci photonic crystal unit cell increases, some sub band gaps appears within this omnidirectional band gap. In this work by using Fibonacci quasi-periodic structures we demonstrate that by increasing Generation Number of Unit cell, some omnidirectional sub-gaps will appear which can be used as a multichannel filter.

Ali Charkhesht
University of Tabriz, Tabriz, Iran - Virginia Polytechnic Institute and
State University, Blacksburg, Virginia

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