Electromagnetic Field in One Dimensional Photonic Crystals by Using the Finite Difference Time Domain (FDTD) Method[1] MARCO A. LOPEZ-ESQUER, FELIPE RAMOS-MENDIETA, JESUS MANZANARES-MARTINEZ, Universidad de Sonora — In this work we present a simulation of the electromagnetic field in one Dimensional Photonic Crystal (1D-PC) using the Finite Difference Time Domain (FDTD) Method. In first place, we present the time evolution of a monochromatic sinusoidal wave through a 1D-PC of finite length. The behaviour of the field is governed by the Photonic Band Structure (PBS) of the infinite crystal. We describe the propagation at allowed and forbidden frequencies. For the allowed frequencies, we present the vibration modes at each one of the Fabry-Perot oscillation minimums. For the forbidden frequencies, we present a relation between the imaginary Bloch vector and the decay of the wave through the structure. In second place, we present how the group velocity changes the light propagation of a pulse inside the finite crystal, especially in the case when the central frequency is near to the band edge. Finally, we analyse the role of the absorption in both cases.

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