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Title:Modeling and analysis of quadruple optical ring resonator performance as optical filter using Vernier principle
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Abstract:Vernier principle based modeling and analysis of an optical ring resonator structure that includes four asymmetric rings are introduced in this paper to obtain very wide free spectral range (FSR). Delay line signal processing approach in Z-domain modeling is used for analysis of waveguide based novel quadruple optical ring resonator (QORR). Two QORR architectures made of SOI and SiN waveguides have been compared, which produce FSR of 343.4 THz 264.6 THz respectively. Apart from obtaining wider FSR and adequate suppression of spurious interstitial modes close to -30 dB, this work presents group delay and dispersion characteristics for QORR made of materials with different effective refractive indices.
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