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Negative Group Delays without Distortion in an Electronic Filter RON HENDERSON, Middle Tennessee State University, JEREMY MUNDAY, Harvard University — A negative group velocity occurs for an electromagnetic signal when the group refractive index of the medium, N_g , is less than zero. The group velocity, described as $v_g = (c/N_g)$, can be faster than c or even negative when $N_g < 1$. All experimental reports of this phenomenon have involved media for which the group velocity was frequency dependent, i.e. $v_g = v_g(\omega)$. As a result, signals are necessarily distorted because different frequency components travel with different velocities. An interesting circumstance would occur in a medium if the group velocity was negative and *constant* over a certain range of frequencies. Any signal containing only frequency components within this range could experience a negative group velocity, yet not be distorted in the process. The group *velocity* in optics has an analogous effect in electronic circuits called the group *delay*. We present observations of constant negative group delays for electronic signals using a specially tailored amplifier design. The design allows a wide range of frequencies to experience a constant group delay, resulting in negatively delayed signals, without distortion.

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