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A Magnus Expansion Analysis of Frequency-Dependent Mueller Matrices MICHAEL REIMER, DAVID YEVICK, University of Waterloo — We have recently demonstrated that, for any physical system characterized by a non-singular, frequency dependent Jones matrix, the frequency evolution of the corresponding Mueller matrix is described by a differential equation whose general solution can be compactly formulated through the Magnus expansion [M. Reimer, D. Yevick, and D. Dumas, submitted to J. Opt. Soc. Am. A, Photon. Technol. Lett.]. [D. Yevick, T. Lu, W. Huang and W. Bardyszewski to be published in J. Opt. Soc. Am. A]. We subsequently applied our analytic results to optical compensators for communications networks and to the estimation of a system's frequency dependent Mueller matrix based on repeated measurements of the output state of polarization for randomly generated input polarization states [M. Reimer, D. Yevick and D. Dumas, submitted to Photon. Technol. Lett.]. We have also incorporated the Magnus expansion into a Clifford algebra description of polarization evolution. This procedure reformulates numerous physical transformations in a simple and transparent manner [M. Reimer and D. Yevick, submitted to Photon. Technol. Lett.].

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