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We study the classes of finite differences that preserve roots of univariate polynomials on lines or in strips and half-planes of the complex plane. In particular, we describe the classes of finite differences that preserve the hyperbolicity of polynomials and prove a finite difference analogue of the Hermite-Pauline theorem. As well, we study finite differences of polynomials with minimal mesh (minimal distance between roots). Corresponding results for entire functions will be presented. (Received June 03, 2015)