Discrete dynamics, continued fractions and hyperelliptic curves

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Abstract. After reviewing some standard facts about continued fractions for quadratic irrationals, we switch from the real numbers to the field of Laurent series, and describe some classical and more recent results on continued fraction expansions for the square root of an even degree polynomial, and other functions defined on the associated hyperelliptic curve. In the latter case, we extend results of van der Poorten on continued fractions of Jacobi type (J-fractions), and explain the connection with a family of discrete integrable systems (including Quispel-Roberts-Thompson maps and Somos sequences), orthogonal polynomials, and the Toda lattice. If time permits, we will make some remarks on current work with John Roberts and Pol Vanhaecke, concerning expansions involving the square root of an odd degree polynomial, Stieltjes continued fractions, and the Volterra lattice..

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