Publ. Mat. **56** (2012), 65–89
DOI: 10.5565/PUBLMAT_56112_03

ISOLATED SINGULARITIES OF BINARY DIFFERENTIAL EQUATIONS OF DEGREE n

T. Fukui and J. J. Nuño-Ballesteros

Abstract: We study isolated singularities of binary differential equations of degree n which are totally real. This means that at any regular point, the associated algebraic equation of degree n has exactly n different real roots (this generalizes the so called positive quadratic differential forms when $n = 2$). We introduce the concept of index for isolated singularities and generalize Poincaré-Hopf theorem and Bendixson formula. Moreover, we give a classification of phase portraits of the n-web around a generic singular point. We show that there are only three types, which generalize the Darbouxian umbilics D_1, D_2 and D_3.

2010 Mathematics Subject Classification: Primary: 37C15; Secondary: 34C20, 34A34, 53A07, 53A60.

Key words: totally real differential form, principal lines, Darbouxian umbilics, index.