The Camassa-Holm equation: A survey

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Abstract. The Camassa-Holm (CH) equation $u_t + uu_x + p_x = 0$, $p - p_x x = u^2 + u_x^2/2$ was introduced by Camassa and Holm in a seminal paper in 1993. The equation was derived in the context of shallow water modeling. The CH equation is completely integrable, and has soliton-like solutions (called peakons) that interact almost linearly. We will focus on the Cauchy problem. Solutions of the equation experience wave breaking in finite time with infinitely steep gradients, while the solution remains finite. At wave breaking, uniqueness breaks down, and a question that we will discuss is how to restore uniqueness and introduce a novel Lipschitz metric that measures stability.