Cynthia V. Flores*, cynthia@math.ucsb.edu. On decay properties of solutions to the IVP for the Benjamin-Ono equation.

In this work we investigate unique continuation properties of solutions to the initial value problem associated to the Benjamin-Ono equation given by

\[
\begin{align*}
\partial_t u + \mathcal{H} \partial_x^2 u + u \partial_x u &= 0, \quad x, t \in \mathbb{R} \\
u(x, 0) &= u_0(x)
\end{align*}
\]

with \( \mathcal{H} \) denoting the Hilbert transform

\[
\mathcal{H} f(x) = \frac{1}{\pi} \text{p.v.} \left( \frac{1}{x} * f \right)(x) = \frac{1}{\pi} \lim_{\epsilon \downarrow 0} \int_{|y| < \frac{\epsilon}{x}} \frac{f(x-y)}{y} dy
\]

in weighted Sobolev spaces \( Z_{s,r} = H^s(\mathbb{R}) \cap L^2(|x|^{2r} \, dx) \) for \( s \in \mathbb{R}, \) and \( s \geq 1, \) \( s \geq r. \) More precisely, we prove that the uniqueness property based on a decay requirement at three times can not be lowered to two times even by imposing stronger decay on the initial data. (Received July 19, 2013)