Comparison of nonlinear, geometric, and absorptive effects in high-amplitude jet noise BRENT REICHMAN, KENT GEE, TRACIANNE NEILSEN, JOSEPH THADEN, BYU — In recent years, understanding of nonlinearity in noise from high-performance jet aircraft has increased, with successful modeling of nonlinear propagation in the far field. However, the importance and characteristics of nonlinearity in the near field are still debated. An ensemble-averaged, frequency-domain version of the Burgers equation can be rearranged in order to directly compare the effects of nonlinearity on the sound pressure level with the effects of atmospheric absorption and spreading on a decibel scale. Results from applying this analysis to F-22A data at various positions in the near field reveal that in the near field the nonlinear effects are of the same order of magnitude as spreading and that both of these effects are significantly greater than absorption in the area of maximum radiation. [Work supported by ONR and an ORISE fellowship through AFRL.]

Brent Reichman
BYU