ACOUSTICS2008/2506 Frequency-domain diffraction for edges of arbitrary length with efficient numerical integration

Peter Svensson^a and Paul Calamia^b ^aNorwegian Univ. of Science and Technology, O.S. Bragstads plass 2B, Dept. of Electronics and Telecommunications, NO-7491 Trondheim, Norway ^bRensselaer Polytechnic Institute, Greene Bldg., 110 8th St., Troy, NY 12180, USA

Frequency-domain edge diffraction from an infinite wedge insonified by a point source has been widely studied, with various analytical solutions dating back nearly a century. In this talk we present an alternative frequencydomain solution which can be used for finite as well as infinite edges. The expression, given as a line integral along the diffracting edge, is derived from an analytical time-domain expression presented in [U. P. Svensson et al., J. Acoust. Soc. Am. 106, 2331-2344 (1999)]. The new formulation is shown to be equivalent to an exact, analytical, contour-integral formulation for the infinite wedge via a variable transformation. Results for various finite and infinite edge cases will be presented, and numerical integration using an efficient quadrature method for highly oscillatory integrals will also be discussed.