On the use of the real part of the Green function of an infinite rigid guide

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For the calculation of the effect of discontinuities and radiation, the use of the Green function of an infinite guide is classical it involves real, decreasing exponentials for evanescent modes and complex, sinusoidal exponentials for propagating modes. Therefore it diverges at cutoff frequencies. A formulation based on the real part of the same Green function avoids this difficulty; the only condition is that the non straight portion is far enough from any other one (or sources, extremities, etc ...) in order for the evanescent modes to be negligible in the control volume [see e.g. ref. 1]. The formulation is used in a concrete case, and compare to a previous one [2].

[1] J. Kergomard, A. Khettabi, X. Mouton, Propagation of acoustic waves in two waveguides coupled by perforations. I. Theory. Acta Acustica 1994, 2, 1-16. [2] C. Durant, G. Robert, P.J.T. Filippi, P.O. Mattei, Vibroacoustic response of a thin cylindrical shell excited by a turbulent internal flow, J. Sound Vib. 2000, 229, 1115-1155.