Abstract Submitted
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Mode Conversion via Invariant Imbedding D. G. SWANSON, Auburn University — The method of invariant imbedding[1] offers an alternative for calculating the scattering coefficients for mode conversion problems. The advantage is that the wave equation need not be solved at all, since the method provides a set of nonlinear first order coupled differential equations in the scattering coefficients themselves. For a second-order wave equation, the equations are of the form $dR/dx = f[R(x), k(x), k'(x)]$ and $dT/dx = f[R(x), T(x), k(x), k'(x)]$ where $k(x)$ is the WKB solution of the wave equation. For a fourth-order system such as is appropriate for mode conversion near a resonance, there is a set of equations for $R(x)$, $T(x)$, $C_-(x)$, and $C_+(x)$ for incident fast waves and incident slow waves from each side. While the equations are more formidable than those for the second-order system, the solution involves only nonlinear first-order ordinary differential equations and avoids the problems associated with exponentially growing wave amplitudes.

[1]R. Bellman and G. M. Wing, **An Introduction to Invariant Imbedding**, (John Wiley and Sons, 1975)

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