Meeting: 1004, Bowling Green, Kentucky, SS 7A, Special Session on Semigroups of Operators and Applications

1004-34-126 **Kim Tuan Vu*** (vu@westga.edu), Department of Mathematics, University of West Georgia, Carrollton, GA 30118, and **Amin Boumenir**. *Transmutations for Strings.*

Let $\varphi_i(x,\lambda),\ i=1,2$, be solutions of the string equations, respectively

$$\begin{cases} \mathbb{S}_i(\varphi_i)(x) := -\frac{d}{dM_i(x)}\frac{d}{dx}\varphi_i(x,\lambda) = \lambda\varphi_i(x,\lambda), \quad 0 \le x < \infty \\ \varphi_i(0,\lambda) = a,\ \varphi_i'(0,\lambda) = b, \quad a^2+b^2 \neq 0 \end{cases}, \quad i=1,2. \tag{i}$$

A transmutation transforms solutions of one equation into solutions of the other equation. This mapping is at the heart of the inverse spectral problem as it allows not only to compare eigenfunctions but also operators $\mathbb{S}_i$ themselves. The importance of a transmutation for the strings stems from the fact that Krein's theory for the string inverse spectral problem is based solely on function theory and not on the transmutation operator idea as the Gelfand-Levitan theory does with the Sturm-Liouville problem. This talk is to address the existence and construction of Volterra transmutations for the string operators so to open the possibility of solving the inverse spectral problem for the strings by the Gelfand-Levitan approach. (Received January 21, 2005)