1099-34-306   **Sergii M. Torba*** (`storba@math.cinvestav.edu.mx`). *On a new method of approximation of transmutation operators for Sturm-Liouville equations.*

An operator T is called a transmutation operator for the pair of operators A and B if it is continuous, continuously invertible on a suitable topological space and satisfy $AT = TB$.

When $A = -\partial^2 + q(x)$ and $B = -\partial^2$, a transmutation operator T can be realized in the form

$$Tu(x) = u(x) + \int_{-x}^{x} K(x,t)u(t)dt$$

with the integral kernel K satisfying a Goursat problem. Due to the transmutation property the general solution of the equation $Au = w^2 u$ is a linear combination of the images of functions $\cos wx$ and $\sin wx/w$ under the action of T.

We propose a method of approximation of the integral kernel $K(x,t)$ in the form of a polynomial in t whose coefficients are functions of x. Due to the form of the approximation all the integrals appearing during the calculation of $T \sin wx$ and $T \cos wx$ with the approximated kernel can be evaluated explicitly. The method starts from a particular solution f of the equation $Af = 0$ and reduces the approximation of K to the solution of two one-dimensional approximation problems. All the steps of the method are suitable for numerical implementation leading to a highly efficient method of the solution of Sturm-Liouville spectral problems.

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