

APPLIED MATHEMATICS SEMINAR

Department of Mathematics

University of West Georgia

11:00 AM, WEDNESDAY, SEPTEMBER 12, 2007, BOYD 330

Speaker: Dr. Amin Boumenir, UWG

Title: **Interpolation and Transmutation**

Abstract

Consider the operator equation in X

$$L_1 X - X L_2 = Y \quad (1)$$

where Y , L_1 and L_2 are given operators. When L_1 and L_2 are bounded operators, one can prove the existence and uniqueness of a solution X ,

$$X = \frac{1}{2\pi i} \int_{\Gamma} (L_1 - \lambda I)^{-1} Y (L_2 - \lambda I)^{-1} d\lambda$$

and (1) has a unique solution if and only if $L_1 X = X L_2$ has the trivial solution only. In the simple case when L_1 and L_2 are finite matrices with disjoint spectra, then $L_1 X = X L_2$ has the trivial solution $X = 0$, which is contained in the Sylvester-Rosenblum theorem. In this talk we show why uniqueness may not hold, when L_1 and L_2 are unbounded operators. The main idea is to use transmutation operators between L_1 and L_2 to construct a non trivial solution.

All are welcome.