1027-42-56 **Manuel D. de la Iglesia*** (mdi29@us.es), Departamento de Analisis Matematico, Facultad de Matematicas, 41080 Sevilla, Sevilla, Spain, and **Antonio J. Duran** (duran@us.es), 41080 Sevilla, Spain. *Some examples of orthogonal matrix polynomials satisfying odd order differential equations.* Preliminary report.

It is well known that if a family orthogonal scalar polynomials with respect to a positive measure (supported on the real line) forms a set of eigenfunctions of a finite order differential operator, then its order has to be even. This property no longer holds in the case of matrix orthogonal polynomials. The subject of this communication is to present examples of weight matrices having orthogonal polynomials which are eigenfunctions of certain differential operators of odd order. The weight matrices are of the form

$$W(t) = t^{\alpha} e^{-t} e^{At} t^{B} t^{B^*} e^{A^* t},$$

where A and B are certain (nilpotent and diagonal, respectively) $N \times N$ matrices. These weights are the first examples illustrating this new phenomenon and are not reducible to scalar weights.

Also, the behavior of the algebra of differential operators having these families of orthogonal matrix polynomials as eigenfunctions is analyzed for the 2×2 case. In the scalar case, the algebra reduces to the associated second order differential operator and any polynomial in that operator. However, in the matrix setting we have discovered families of orthogonal polynomials which are common eigenfunctions for several linearly independent second order differential operators. (Received February 10, 2007)