1116-39-2527 **Catherine Payne*** (capayne2@uncg.edu) and **R. Fabiano**. *Stability conditions for linear neutral delay differential equations.* Preliminary report.

We study the stability of the C_0 semigroup associated with a neutral delay differential equation of the form

$$\frac{d}{dt}\left[x(t)+\sum_{k=1}^{n} C_k x(t-r_k)\right] = Ax(t)+\sum_{k=1}^{n} B_k x(t-r_k)$$

with initial data $x(0)+\sum_{k=1}^{n} C_k x(-r_k) = \eta_0$ for a given $\eta_0 \in \mathbb{C}^m$ and $x(\theta) = f_0(\theta)$ on $[-r_n, 0)$ for a given function $f_0(\theta) \in L_2(-r_n, 0; \mathbb{C}^m)$. We assume that A, $B_1, B_2, \ldots, B_n$ and $C_1, C_2, \ldots, C_n$ are complex $m \times m$ matrices for $m \in \mathbb{N}$. We search for delay-independent sufficient conditions on the matrices for exponential stability of the solution semigroup associated with this equation. In the case where A, B_i, and C_i are scalars, the best condition is known. In particular, Li proved a sufficient condition for a neutral equation with one delay and real matrices. Hu and Hu later improved this condition, which has been extended to multiple delays. These results are based on direct analysis of the associated characteristic equation. We obtain another sufficient condition by renorming the state space to obtain a strong dissipative inequality on the generator of the solution semigroup, and compare our condition to others. (Received September 22, 2015)