1020-06-114 **Donald Beken** (beken@uncp.edu), Department of Mathematics and Computer Scienc, University of North Carolina at Pembroke, Pembroke, NC 28372, and **Ralph DeMarr*** (demarr@unm.edu), Department of Mathematics, University of New Mexico, Albuquerque, NM 87131. *Strange inequalities in a partially ordered linear algebra.* Preliminary report.

We first consider the linear algebra of all matrices with real entries of some fixed order n. We use I to denote the identity matrix. We partially order these matrices entrywise to obtain a partially ordered linear algebra (POLA). We next select an idempotent matrix E ($E^2 = E$) and a nilpotent matrix M ($M^2 = 0$). Is it possible that $2I \leq E + M$? No, this inequality is not possible in this POLA.

We next consider the infinite matrix algebra of column-finite matrices with real entries. As above, we partially order these matrices entrywise to get a POLA. In this case it is possible to find idempotent E and nilpotent M such that $2I \leq E + M$. We refer to this latter inequality as a strange inequality.

If we consider four types of matrices: idempotent $E^2 = E$, nilpotent $M^2 = 0$, involution $S^2 = I$ and imaginary $J^2 = -I$, then there are ten basic strange inequalities involving these types of matrices. All of these inequalities can be obtained in the POLA of column-finite matrices.

Sample result 1. If $I \leq S + J$, then S and J cannot commute.

Sample result 2. If $3I \leq E + S$, then E and S cannot be nonnegative matrices.

Many other results will be discussed. (Received August 21, 2006)