1086-VM-657   **Andrew J. Klimas*** (`aklimas@xula.edu`), Xavier University of Louisiana, Department of Mathematics, New Orleans, LA 70125. *Extremals and Faces of the Completely Positive and Positive Semidefinite-Preserving Cones.*

This paper on the extremals and faces of the cone $\pi(PSD_n)$ of positive semidefinite-preserving linear transformations on the complex vector space of complex matrices of order n and its self-dual subcone CP_n of the completely positive linear transformations expands on previous work to say more about the extremals of $\pi(PSD_n)$, namely that every nonsingular element of $\pi(PSD_n)$ is an extremal of $\pi(PSD_n)$ and every extremal of CP_n and of $coCP_n$ is also an extremal of $\pi(PSD_n)$.

While it is known that CP_n is a subcone but not a face of $\pi(PSD_n)$, whether every proper face of CP_n (in the sense of a proper subset) is a face of $\pi(PSD_n)$ is an open question. Examples of such faces do exist, but using a certain characterization of the faces of CP_n , we can exhibit a face of CP_2 that is not a face of $\pi(PSD_2)$.

Open questions remain about whether such a face can be found for $n > 2$ and whether a face of CP_n which lies in the boundary of $\pi(PSD_n)$ is necessarily also a face of $\pi(PSD_n)$. (Received September 10, 2012)