

DREXEL ANALYSIS SEMINAR

April 29, 2019

2-3 PM, Korman 245

**Speaker:** Kennett Dela Rosa (Drexel)

**Title:** Location of Ritz values in the numerical range of normal matrices.

**Abstract:** In 2013, Carden and Hansen proved that fixing  $\mu_1 \in W(A) \setminus \partial W(A)$ , where  $A \in \mathbb{C}^{3 \times 3}$  is a normal matrix with noncollinear eigenvalues, determines a unique number  $\mu_2 \in W(A)$  so that  $\{\mu_1, \mu_2\}$  forms a 2-Ritz set for  $A$ . They observed that  $\mu_2$  is the *isogonal conjugate* of  $\mu_1$  with respect to the triangle formed by connecting the three eigenvalues of  $A$ . In this talk, we consider the analogous problem for a 4-by-4 normal matrix  $A$  and show the existence of a containment region for  $\mu_2$ . In particular, given  $\mu_1 \in W(A)$  in the interior of one of the quadrants formed by the diagonals of  $W(A)$ , we prove that if  $\{\mu_1, \mu_2\}$  forms a 2-Ritz set, then  $\mu_2$  lies in the convex hull of two eigenvalues of  $A$  and the two isogonal conjugates of  $\mu_1$  with respect to the two triangles containing  $\mu_1$ .

Joint work with Hugo J. Woerdeman.