Abstract
Let Ω be the spectral unit ball of $M_n(\mathbf{C})$, that is, the set of $n \times n$ matrices with spectral radius less than 1. We are interested in classifying the automorphisms of Ω. We know that it is enough to consider the normalized automorphisms of Ω, that is the automorphisms F satisfying $F(0) = 0$ and $F'(0) = I$, where I is the identity map on $M_n(\mathbf{C})$. The known normalized automorphisms are conjugations. Is every normalized automorphism a conjugation? We show that locally, in a neighborhood of a matrix with distinct eigenvalues, the answer is yes. We also prove that a normalized automorphism of Ω is a conjugation almost everywhere on Ω.