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**Ray Cheng\*** (rcheng@odu.edu). *The zero sets of  $\ell_A^p$  are nested.*

For  $0 < p \leq \infty$ , the space  $\ell_A^p$  is defined to be the set of analytic functions on the unit disk  $\mathbb{D}$  with Taylor coefficients belonging to the sequence space  $\ell^p$ . The main result is that when  $1 < p < \infty$ , the zero sets for  $\ell_A^p$  depend on  $p$ .

**Theorem** Let  $1 < p_1 < p_2 < \infty$ . There exists a sequence  $W$  of distinct points in  $\mathbb{D}$  such that there is a nontrivial function belonging to  $\ell_A^{p_2}$  that vanishes at all the points of  $W$ , and any function in  $\ell_A^{p_1}$  vanishing on  $W$  must vanish identically.

Rather than go through the details of the proof, which is long and technical, we will highlight some of the underlying ideas, which may be applicable to other problems about  $\ell_A^p$  and other function spaces. These concepts and tools include Birkhoff-James orthogonality and an associated Pythagorean theorem; a notion of “inner” function for  $\ell_A^p$ , a zero set criterion based on an extremal problem and its dual; and some counting tricks. (Received August 26, 2019)