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Invariant subspaces for the shift on  
the vector-valued  $L^2$  space of an annulus

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In this talk we study the invariant subspaces of the shift operator acting on the vector-valued  $L^2$  space of an annulus, following an approach which originates in the work of Sarason. We obtain a Wiener-type result characterizing the reducing subspaces, and we give a description of all the invariant and doubly-invariant subspaces generated by a single function. We prove that every doubly-invariant subspace contained in the Hardy space of the annulus with values in  $\mathbb{C}^m$  is the orthogonal direct sum of at most  $m$  doubly-invariant subspaces, each generated by a single function. As a corollary we prove that a doubly-invariant subspace that is also the graph of an operator is singly generated.