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Searching for new Special Lagrangians with Quality-Diversity Optimization

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Special Lagrangian (sLags) submanifolds are crucial objects for string phenomenology and the SYZ conjecture, yet their explicit construction remains a significant challenge in geometry. In this talk, we introduce a novel computational framework to tackle this problem. Using the Fermat Quintic as a primary testbed, our approach leverages a Quality-Diversity (QD) search algorithm to navigate families of parametrized geometries. This method is engineered to simultaneously reward approximations of the sLag condition while maximizing geometric diversity. Our preliminary findings showcase the potential of this QD framework as a powerful new tool in the ongoing search for novel sLag constructions.

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