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*Singularities of  $K$ -orbits on the flag variety of  $G_2$*

We define  $G_2$  as a complex Lie group with Lie algebra of type  $G_2$ .  $K$  is the centralizer of a particular element of order 2 in  $G_2$ . We parameterize the orbits of  $K$  acting on the flag variety of  $G_2$ , and use MAGMA software to determine where the singularities of the  $K$ -orbit closures lie. We provide applications for the representation theory of  $G_2$ .