Maximal antipodal sets related to $G_2$.

An antipodal set of a Riemannian symmetric space $M$, introduced by B.-Y. Chen and T. Nagano in 1980’s, is a subset $A$ of $M$ on which $s_x(y) = y$ holds for any elements $x, y$ in $A$, where $s_x$ denotes the geodesic symmetry at $x$ on $M$. We explicitly describe maximal antipodal sets of compact Riemannian symmetric spaces related to the compact connected simple Lie group of type $G_2$ by realizing it as the automorphism group of the octonions. Moreover, we observe a close relation between the algebraic structure of the octonions and the Fano plane by using these explicit descriptions. (Received September 13, 2019)