

# On the Diameter of Unitary Cayley Graphs of Rings

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*Abstract.* The unitary Cayley graph of a ring  $R$ , denoted  $\Gamma(R)$ , is the simple graph defined on all elements of  $R$ , and where two vertices  $x$  and  $y$  are adjacent if and only if  $x - y$  is a unit in  $R$ . The largest distance between all pairs of vertices of a graph  $G$  is called the diameter of  $G$ , and is denoted by  $\text{diam}(G)$ . It is proved that for each integer  $n \geq 1$ , there exists a ring  $R$  such that  $\text{diam}(\Gamma(R)) = n$ . We also show that  $\text{diam}(\Gamma(R)) \in \{1, 2, 3, \infty\}$  for a ring  $R$  with  $R/J(R)$  self-injective and classify all those rings with  $\text{diam}(\Gamma(R)) = 1, 2, 3$  and  $\infty$ , respectively. This extends [?, Theorem 3.1].