On the exact spread of sporadic simple groups

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2000 Mathematics Subject Classification. 20D08, 20F05

A group is 2-generated if it can be generated by two elements \(x\) and \(y\). In this case \(y\) is called a mate for \(x\). Brenner and Wiegold in [1] defined a finite group \(G\) to have spread \(r\) if for every set \(\{x_1, x_2, \ldots, x_r\}\) of distinct non-trivial elements of \(G\), there exists an element \(y \in G\) such that \(G = \langle x_i, y \rangle\) for all \(i\). A group is said to have exact spread \(r\) if it has spread \(r\) but not \(r+1\). The exact spread of a group \(G\) is denoted by \(s(G)\). M S Ganief [2] in his PhD thesis proved that if \(G\) is a sporadic simple group, then \(s(G) \geq 2\). In [3] the author and Ganief used probabilistic methods and established a reasonable lower bound for the exact spread \(s(G)\) of each sporadic simple group \(G\). The present paper deals with the search for reasonable upper bounds for the exact spread of the sporadic simple groups.