1145-05-1198 **Marshall M. Cohen*** (marshall.cohen@morgan.edu). *Elements of finite order in the Riordan group.*

We consider elements $\big(g(x), F(x)\big)$ in the Riordan group $\mathcal{R}$ over a field $\mathbb{F}$ of characteristic 0, where $g(x) = g_0 + g_1 x + g_2 x^2 + \cdots$, $g_0 \neq 0$, and $F(x) = \omega x + f_2 x^2 + \cdots$, $\omega \neq 0$. We answer some foundational questions about elements of finite order in $\mathcal{R}$.

Theorem 1 states that $\big(g(x), F(x)\big)$ has finite order n in $\mathcal{R}$ if and only if (a) $n = \ell.c.m\big(\mathrm{ord}(g_0), \mathrm{ord}(\omega)\big)$ in $\mathbb{F} \setminus \{0\}$ and (b) $F(x)$ has finite compositional order and (c) There exists $h(x) = h_0 + h_1 x + \cdots$, $h_0 \neq 0$ such that $g(x) = g_0 \cdot \Big(h(x)/h\big(F(x)\big)\Big)$.

Theorem 2 classifies elements of finite order in $\mathcal{R}$ up to conjugation.

Theorem 3 determines the set of eigenvectors of a given element $\big(g(x), F(x)\big)$ of finite order in $\mathcal{R}$. Finally we note that knowledge of the eigenvectors leads to interesting combinatorial formulas. (Received September 19, 2018)