Constructions a finite spectrum with a $v_2$ self map at $p = 3$. Certain families of periodic elements in the stable homotopy groups of spheres arise from non-nilpotent self maps of spectra with special homotopic properties. The Nilpotence and Periodicity theorems describe these $v_n$ self maps and how to detect them using the Morava K theories. It is known that for each finite $n$, we can find a finite spectrum that has a $v_n$ self map, but few concrete examples exist. Working at the prime 3, we use a technique of Palmieri and Sadofsky to construct algebraic analogs of the $v_n$ self maps that are easier to compute, known as $u_i$ self maps. In particular, we prove a theorem about the relation between $u_i$ self maps and Margolis homology, and use it to produce a finite spectrum with a $v_2$ self map. (Received September 20, 2016)