

Ideas from the classification of cycle structure, cont

Therefore, for all i and x we have

$$\sigma_{abc}^i(x) = x + m(a + b) - ld.$$

for some integers m, l satisfying $|m| + |l| \leq i$.

Let $k = \gcd(a + b, d) = \gcd(a + b, b + c)$. Then the orbit of x under σ_{abc} will stay within one residue class modulo k .