# Computability theory question

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Fix a Godel numbering of the computable functions, say phi_n is the nth computable function.

Let superscripts denote iteration: phi_n^1(i)=phi_n(i), phi_n^j(i) = phi_n(phi_n^{j−1}(i)).

Is it possible that there is some n, and some k>1, such that for every i,
phi_n^k(i) = phi_n(i)? (In particular, phi_n is total)

If the answer is "no", then I can prove something nice.. =) Not homework related.

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