

4. **(Fixed-point iteration)** Let p be a fixed point of the function g , and assume $\max |g'(x)| = k < 1$. Consider the fixed-point iteration $p_{n+1} = g(p_n)$. Prove the following error estimate:

$$|p_{n+1} - p| \leq \frac{k}{1 - k} |p_{n+1} - p_n|.$$

In your proof, you may use (with citation) the theorems that we proved in class or the results in the book.

(If you use any theorem, please quote with your solution. Thank you.)