HW 2
3

α IS FIXED POINT

$(1-k)\,|\alpha - x_{n+1}| \le k\,|x_{n+1} - x_n|$

$|\alpha - x_{n+1}| - k\,|\alpha - x_{n+1}| \le k\,|x_{n+1} - x_n|$

MAXIMUM $|g'(x)| = k < 1$

PROVE:

$$|\alpha - x_{n+1}| \le \frac{k}{1-k}\,|x_{n+1} - x_n|$$

BY MVT:

$$|\alpha - x_{n+1}| = |g'(\xi)|\,|\alpha - x_n| \le |\alpha - x_n|$$

IN GENERAL:

$|\alpha - x_n| \le C\,|\alpha - x_{n+1}|^r$

say $r = 1$

$|\alpha - x_{n+1}| \le k\,|\alpha - x_n|$

$|g'(\xi)|\,|\alpha - x_n| \le |\alpha - x_n| \le k\,|\alpha - x_n|$

$$|\alpha - x_n| \le \frac{|\alpha - x_n|}{|g'(\xi)|} \le k\,\frac{|\alpha - x_n|}{|g'(\xi)|}$$

WHAT YOU DON'T DO
TONIGHT

YOU WILL NEVER
HAVE ANOTHER OPPORTUNITY
TO DO