

## Problem 6: Limit of a Sequence

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Let a sequence of real numbers be defined as follows:  $a_1 = a$ ,  $a_2 = b$  and  $a_{n+2} = \frac{a_n + a_{n+1}}{2}$  for  $n \geq 1$ , where  $a$  and  $b$  are fixed real numbers with  $a < b$ . Find  $\lim_{n \rightarrow \infty} a_n$ .

As always, show your work, fully explain and justify your answer. A solution mainly obtained by computers or calculators will not be accepted.

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Posting Date 11/3/2023. Submit solutions to Noah Aydin, Mathematics Department, RBH 319 by e-mail or hard-copy by noon on Friday, November 17, 2023. An email submission must be a single pdf file. Hard copy submissions must be dropped in the file holder at my office door (Hayes 319) and must include a time stamp.