Directions. For full credit, please submit your answer to the following problem in a \LaTeX\-prepared document. Class participants are encouraged to prepare solutions in a collaborative mode but to prepare their to-be-submitted write-ups individually. The consequences of sharing files, electronic or otherwise, are discussed in the course syllabus.\footnote{If the wording of this problem was discussed in detail in the classroom, the course instructor expects to see similar phrases and sentences in reading the submissions.}

Please include the problem number along with a statement of the problem in your submission. Please also include your e-mail address on your submission.

**Problem.** Let $\{a_k\}_{k=1}^\infty$ denote a sequence in $\{0, 1, 2\}$. Prove that $\sum_{k=1}^\infty \frac{a_k}{3^k}$ converges to a real number in $[0, 1]$. 