Directions. 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.

**Problem.** Prove the following lemma.

(The lemma asserts that the ternary representation (in terms of 0’s and 2’s) of each element in the Cantor set is unique.)

Lemma. Let $a_k, b_k \in \{0, 2\} \forall k \in \mathbb{Z}^+$. If

$$\sum_{k=1}^{\infty} \frac{a_k}{3^k} = \sum_{k=1}^{\infty} \frac{b_k}{3^k}$$

then $a_k = b_k \forall k \in \mathbb{Z}^+$. 