Billiards

Jonathan Allen, John Wang

Massachusetts Institute of Technology

November 22nd, 2013

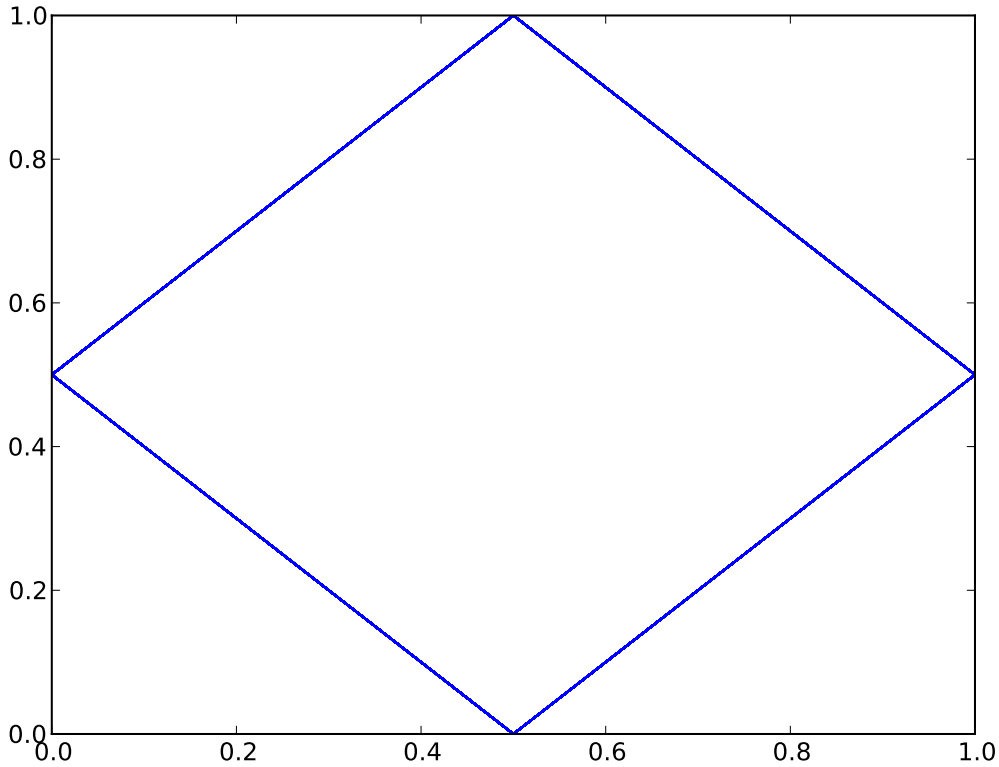
Introduction

- Billiard ball bouncing in a square
- Assume no gravity or friction
- Examine sequence of sides

Example

Example

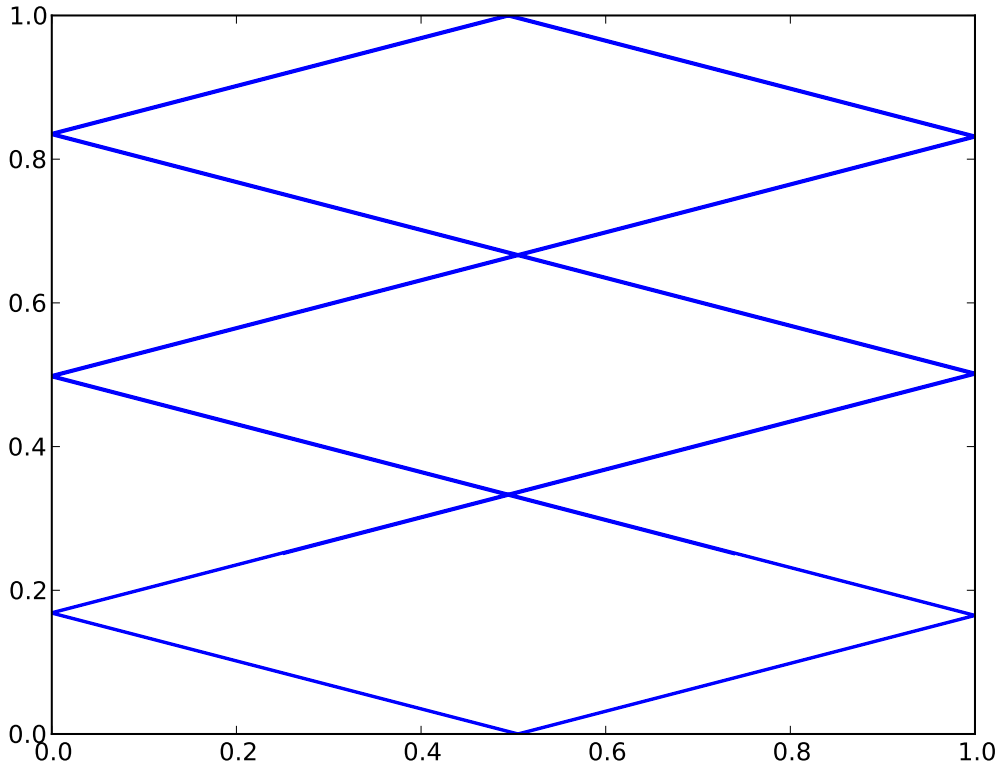
Examine the sequence: ‘abab‘



Another Example

Example

Examine the sequence: ‘aaabaaab‘

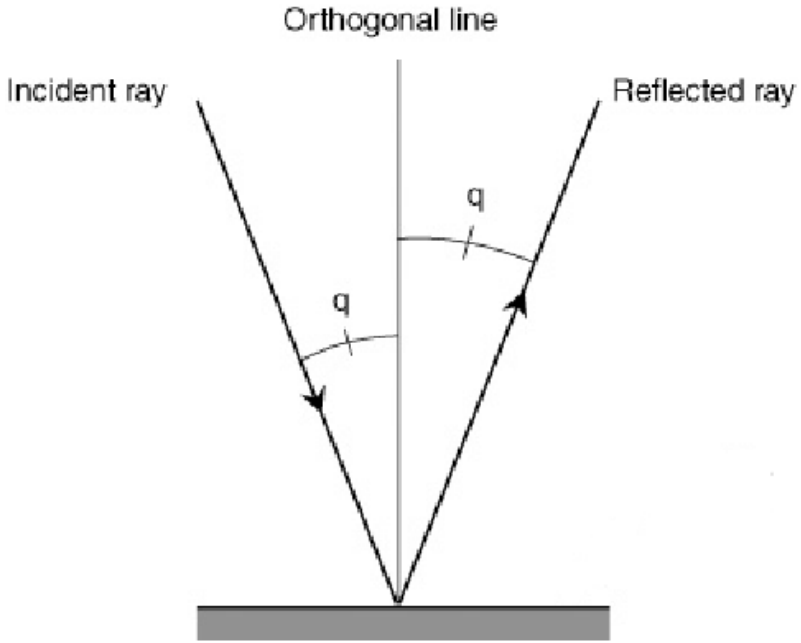


Presentation Outline

Notation

Definition

A table T is the unit square in R^2. A particle $p \in T$ begins at position $\bar{x}_0 \in T$ with velocity $\bar{v}$. When the particle reaches an edge of the table, velocity is reflected about the line perpendicular to the table's edge.



Notation

Definition

Sequence

Problem Statement

Problem: What properties of s