位置ベース法を用いた凧シミュレータの開発

A Kite Simulation System using Position-based Method

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Kite flying is a popular entertainment not only at ceremonies and festivals, but also in sports and competition games, such as Kite Fighting. Though a thin string, the player can control the kite to fly high in the sky. The type of kite is variable and can be simply divided into several categories, according to its structure and geometry shape, such as kite trains and 3D kites.

This paper proposed a fast and stable system for kite flying simulation with taking several shapes into account. Our kite simulation system consist of three parts: kite string simulator, wind simulator and kite integrator. A kite is surrounded by air flow, and interacts with it, which is difficult to calculate due to its thinness feature. Traditionally, the aerodynamic forces of a kite is based on expensive wind tunnel experiments or elaborate data-driven technique which can not be easy to implement. In our paper, we measure the kite string on a stable position-based method and model the wind flow as several particles using Smoothed Particle Hydrodynamics (SPH), and simulate the kite-fluid interaction by a set of sensor particles based on the kite model shape. Our system allows multiple types of kite handling, such as kite trains and 3D box kites, and can be implemented without any difficulty.

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