

DRAGON FIRE MODELING AND SIMULATION IN 3D FOR COMPUTER ANIMATION

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INTRODUCTION

We present a model for animating flames with realistic dynamics, separation, flickering and scalable detail. We also introduce a variety of procedural and parametrical controls such as wind-fields. On Fig. 1 is the main source of our motivation, flame we created for school project in Maya utilizing the fluids method.

MODEL, DYNAMICS AND STRUCTURE

- The fundamental structural element of each flame is an interpolating b-spline curve.
- The flame moves according to differential equation which consists of wind-field term, diffusion term, source-movement term and buoyancy term.

- Flame separation and flickering is based on stochastic models. Multiple flames can join into one.



Fig. 1

- Wind-fields are a vector field modelled as a linear combination of four basic types of topological elements.
- The flame particles are point-sampled to the parametric spline space using rotationally symmetric 2D profile.
- Visualisation is performed using billboarding and particles are shaded according to their age and temperature.

RESULTS

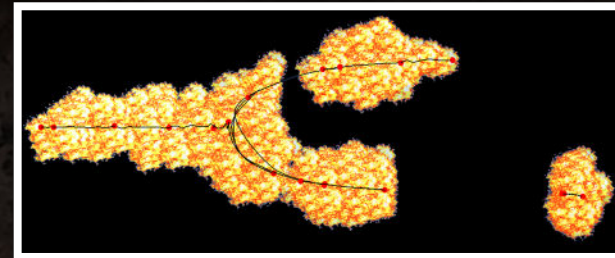


Fig. 2 - Our method using a combination of linear and source wind-fields. Notice the separated parts of the flame.

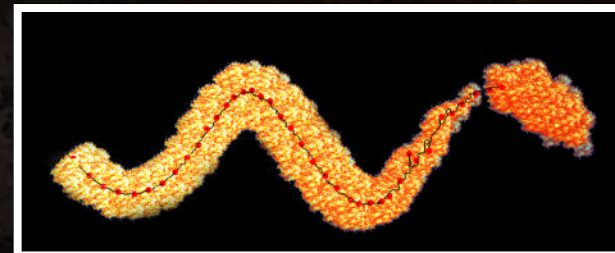


Fig. 3 - Combination of linear and vortex wind-fields. The flame gets darker as it's temperature decreases.