

# Adaptive Tearing and Cracking of Thin Sheets

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## 1 Summary

In the research paper, "Adaptive Tearing and Cracking of Thin Sheets" by Tobias Pfaff, Rahul Narain, Juan Miguel de Joya, and James F. O'Brien, these researchers conducted several ways to imitate fracture and tearing in a variety of materials that have different textures in the field of Computer Graphics. These researchers focused on techniques for high-fidelity simulation of cracks and tears in thin sheets with adaptive triangle meshes. Through adaptive meshing, resolution around potential fracture regions can be increased to accurately produce realistic behavior. The problems that lies behind that is that within the simulation, there can be spurious crack initiation, unrealistic crack boundaries, and loss of shapes. So the solutions to these problems that the researchers proposed are remeshing, plasticity, fracture model, and directibility.

In this paper, it discusses a lot about triangle meshing and meshing in general. Since I haven't taken Computer Graphics yet, I had to research what it was. Triangle meshing is a type of polygon meshing that gives shape to an object through a collection of vertices, edges and faces. Triangle meshing is the most common type used because many graphics software packages and hardware devices can be more efficient through the usage of triangles.

The two insights that I learned through this paper is that adaptive remeshing is central to efficiency and accuracy as it increases the mesh resolution around the crack tip

and maintaining well-shaped elements as the fracture propagates and coarsens the mesh in regions where stress is relieved; and that specific crack path of a fracturing simulation is hard to predict. So, as an oversight, realistic simulation of fracture is hard to stimulate and needs more research put into it.

From this paper, I learned that if I truly want to enter this field of computer science, I need to solidify my foundation of Linear Algebra. Computer Graphics relies completely on all sorts of algorithms and matrix operations that if I don't know what it is, I'd be completely lost.

## 2 Reference

To find this paper, click on the following link

<http://graphics.berkeley.edu/papers/Pfaff-ATC-2014-07/Pfaff-ATC-2014-07.pdf>