"Measuring Particle Flow by Voronoï Diagrams"

Vanderdonckt, Jean ; Soares Frazao, Sandra ; Zech, Yves ; Villarreal Narvaez, Santiago

ABSTRACT

A Particle-Trajectory Velocity (PTV) of moving particles can be analyzed by a digital imaging method based on the Voronoï diagram, which is the dual of the Delaunay triangulation. While this technique has been already applied in various fields, such as homogeneous fluidization, uniform debris flow, this paper adapts and applies this technique to the area of very small moving particles, such as in spermocytogram, as follows: 1) A high-resolution microscope acquires a video sequence of the moving particles; 2) Image segmentation is achieved by detecting discrete particles in each image based on the position of their center; 3) A Voronoï diagram determines the influence zones of each particle at time t and t+dt 4) A correspondence is established between the two images at time t and t+dt 5) The velocity is calculated on this basis.

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Measuring Particle Flow by Voronoï Diagrams

Jean VANDERDONCKT*[1], Sandra SOARES-FRAZÃO[2], Yves ZECH[2],
Santiago VILLARREAL-NARVAEZ[1]

*Corresponding author
Université catholique de Louvain (UCLouvain)
*[1]Louvain Research Institute in Management and Organizations (LouRIM)
Place des Doyens 1 – B-1348 Louvain-la-Neuve, Belgium
{jean.vanderdonckt, santiago.villarreal}@uclouvain.be
[2]Civil and environmental engineering (GCE)
Place du Levant, 5 – 1348 Louvain-la-Neuve, Belgium
{sandra.soares-frazao,yves.zech}@uclouvain.be

Abstract: *A Particle-Trajectory Velocity (PTV) of moving particles can be analyzed by a digital imaging method based on the Voronoï diagram, which is the dual of the Delaunay triangulation. While this technique has been already applied in various fields, such as homogeneous fluidization, uniform debris flow, this paper adapts and applies this technique to the area of very small moving particles, such as in spermocytogram, as follows:*

1) A high-resolution microscope acquires a video sequence of the moving particles;
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Key Words: *gesture tracking, motion capture, motion tracking, particle tracking, Voronoï diagram.*

1. INTRODUCTION

The present paper summarizes the output of the VITALITY (Voronoï Imaging Techniques for the Analysis of sperm motiLITY) research project, funded by DGO6, Région Wallonne, under Convention n°0516079.

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