

Numerical Construction of Deformation Field in a Converging Channel

INVENTOR: Syafikah binti Ayob
FACULTY: Faculty of Industrial Science & Technology
UNIVERSITY: University of Malaysia Pahang
EMAIL: syafikah7182@gmail.com
CO-INVENTORS: Dr. Nor Alisa binti Mohd. Damanhuri, Intan Sabariah Sabri



Product Background

- The algorithm of a numerical method for constructing the deformation of the granular material's flow.
- This algorithm developed to construct the stress, ψ , and velocity distribution field in the deformation region.
- The coordinates (x, y) , stress variables (p, ψ) and velocity (v_α, v_β) at each point could be approximated.
- The stress distribution field and velocity distribution field was constructed by applying four of the most widely occurring elementary stress boundary value problems.
- This algorithm was then applied to the extrusion problem, one of the most common processes in food manufacturing processing.



Figure 1. Granular Materials

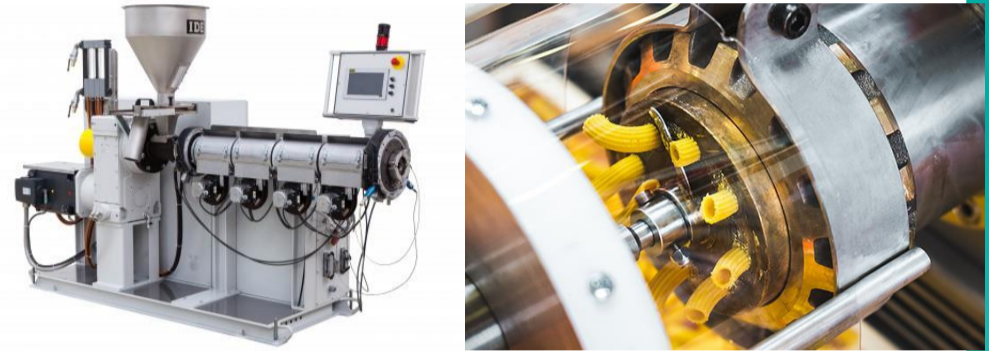


Figure 2. Extruder Machine

Methods

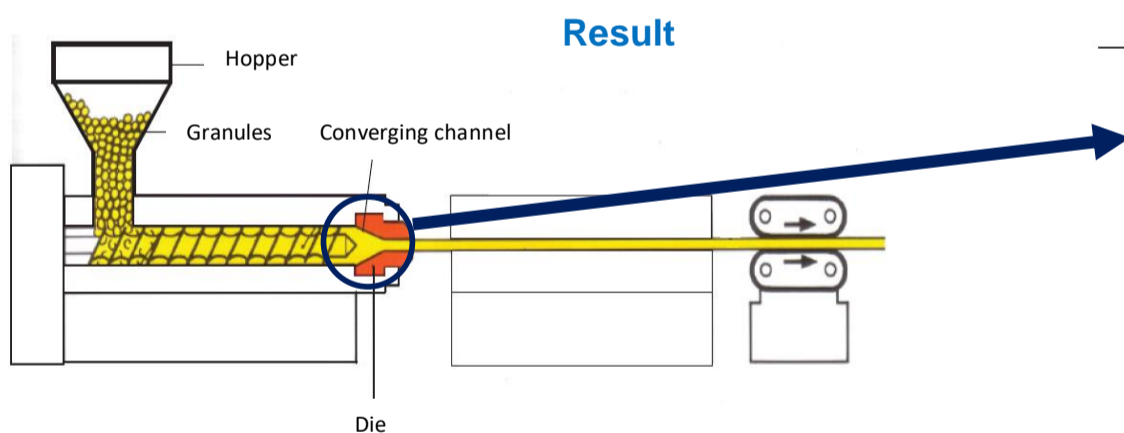
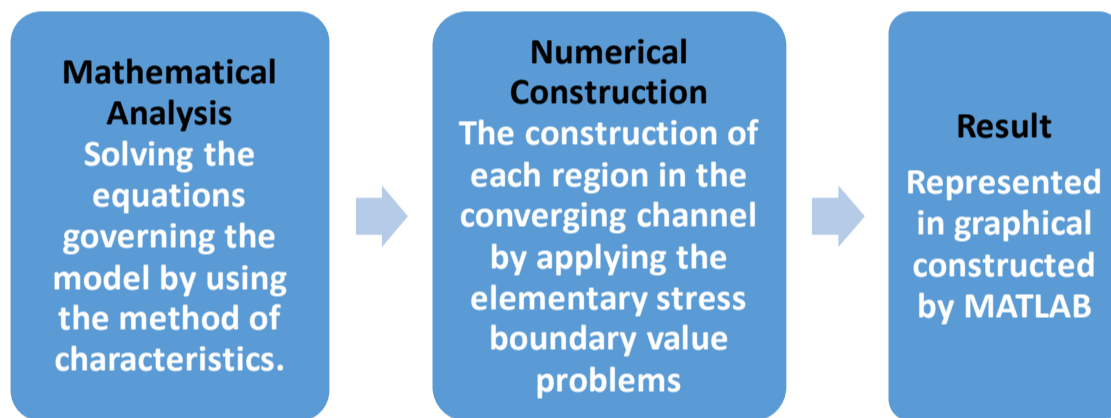


Figure 3. Schematic diagram of extruder machine

Inventiveness

- Useful in designing equipment and structures, such as in granular transportation and storage.
- Could prevent loss in production, extra labour, plant downtime, poor quality control, materials and unreliable processing with a proper designed equipment.

Application

- The computational algorithm is useful for approximating the deformation for the flow of granular materials
- Useful in technical handling and troubleshooting the equipment.

Acknowledgment

- We would like to thank the University Malaysia Pahang for funding this research under UMP internal grant RDU190308

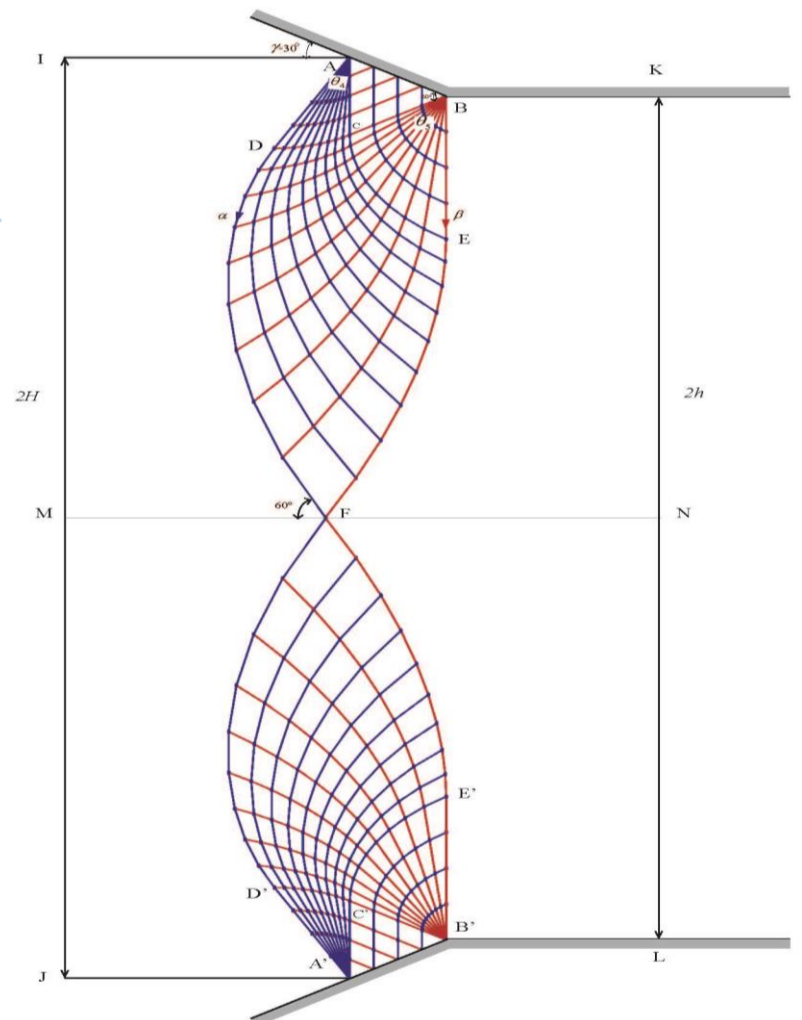


Figure 4. Matlab construction of deformation region

Publication

- Numerical Approximation of Plane Deformation for the Indentation of Granular Material by a Smooth Rigid Wedge Punch, 7(4):166-171, 2019.
- A General Numerical Approximation of Construction of Axisymmetric Ideal Plastic Plane Deformation of a Granular Material, 890, 012059, 2017.
- Numerical Approximation of Centred Fan Field Region for the Indentation of Granular Material by a Smooth Rigid Wedge, 2138, 030008, 2019.
- Numerical Construction of Deformation Field under Wedge Punch, 14(S) December: 185-200, 2020.

Award

- SILVER CITREX, 2019