ÓBUDAI EGYETEM
ÓBUDA UNIVERSITY

Óbuda University
Doctoral School of Material Sciences and Technology

Optimization of ball end milling tool path in case of free form milling

PhD Student: Abdul Whab Mgherony

Supervisor: Dr. Balázs Mikó

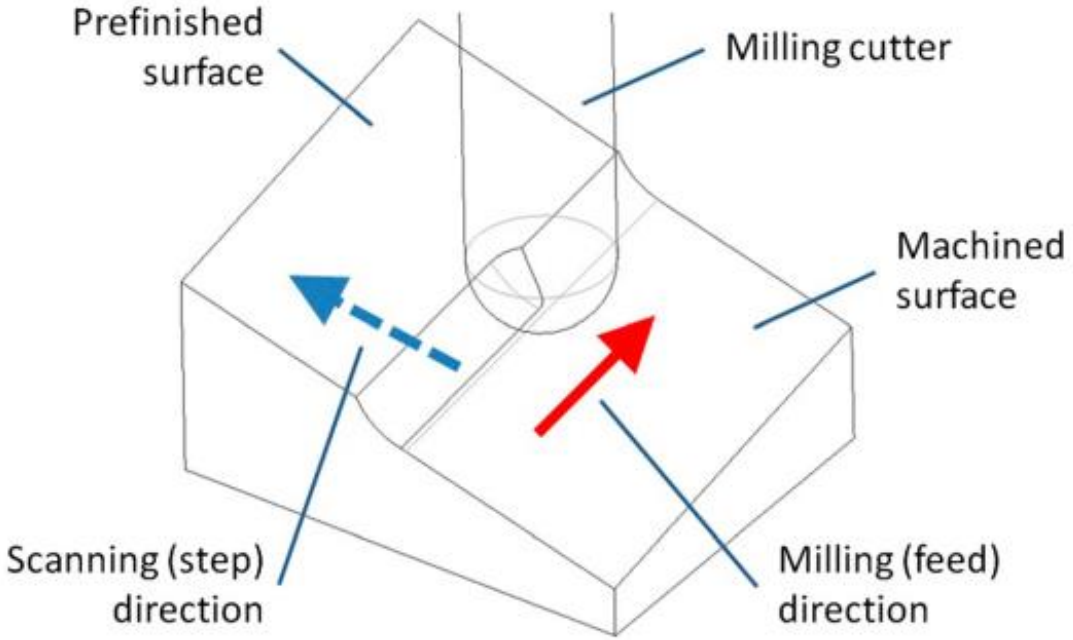
Main Topics

Freeform surfaces are defined as surfaces those have one or more nonplanner, nonquadratic surfaces that represented by parametric and/or tessellated models.

Ball end mills : Using Ball end mill has become widely in manufacturing specially in High speed machining process. The unique shape of the cutting edge (Helix-type, S-type, etc) gives this tool a vital role in machining sculpture surfaces or what it is called free form surfaces.

The aim of this research

- The aim of this research is to find a new tool path planning strategy for freeform surfaces using ball end tool,
- which considers the changing of the working diameter and/or cutting speed.



Results of the previous semester

- In the first semester a study of the previous researches that concerns in Design of Experiments which allows to collect required date those are suitable for further statistical analyses resulting in valid and objective conclusions, and researches that related with ball-end milling which is the technology that will be used in this research, have been done.
- Courses completed
    1. Manufacturing process planning
    2. Experimental design (*review article is under publishing*)

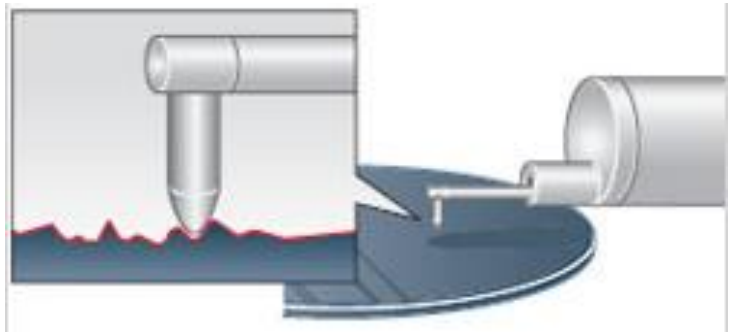
Results of the actual semester

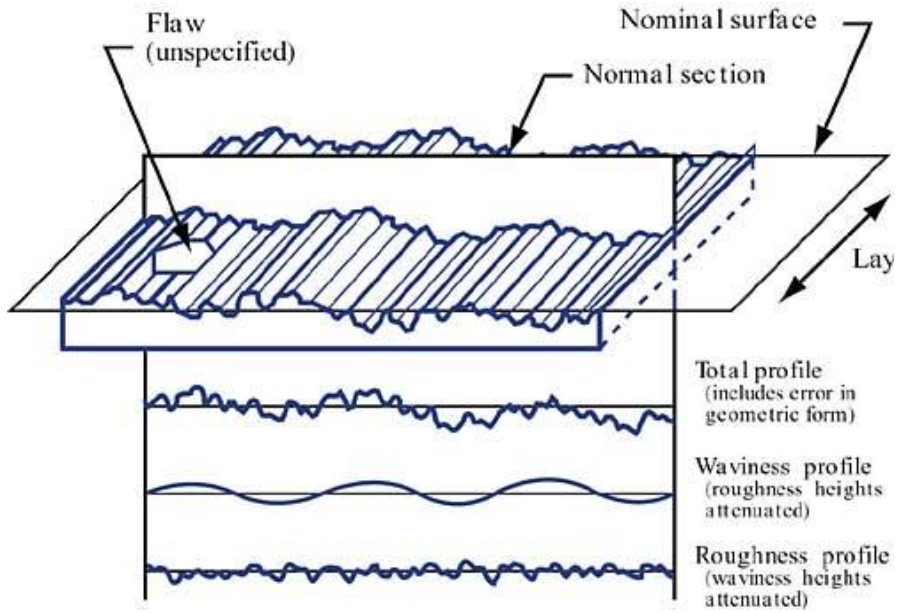
- During this semester a literature review related of surface topography and milling cutting operation have been studied.

1. In the field of milling operation an investigation regarding the cutting forces, chip formation and tool wear has been done.
2. In the field of surface topography, the focus was on the surface roughness because it is the most important factors related to this research. A deep study regarding its parameters in 2D and 3D measurements and the used tools for this measurements has been done.

Courses completed

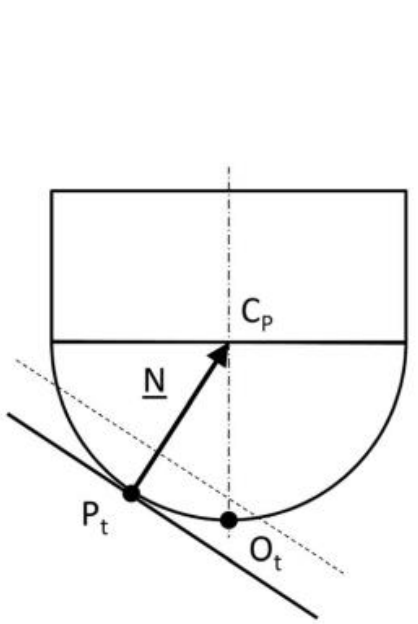
1. Characterisation of surface microgeometry
2. Metal cutting theory

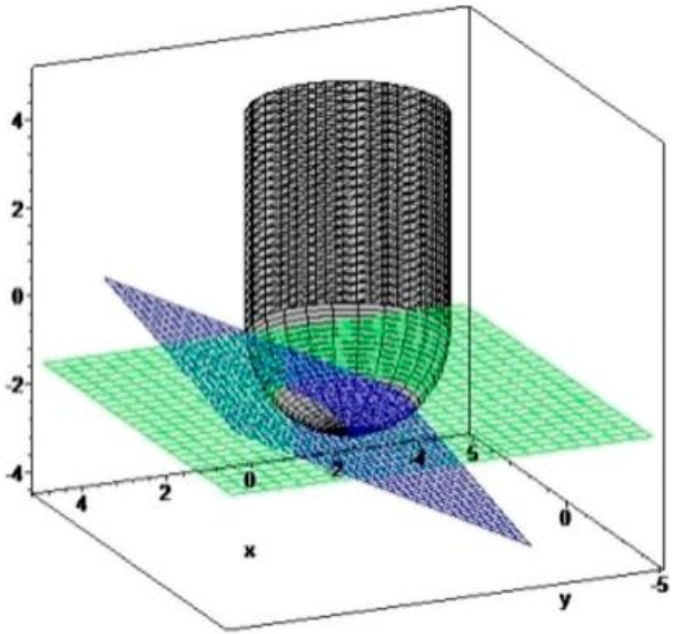


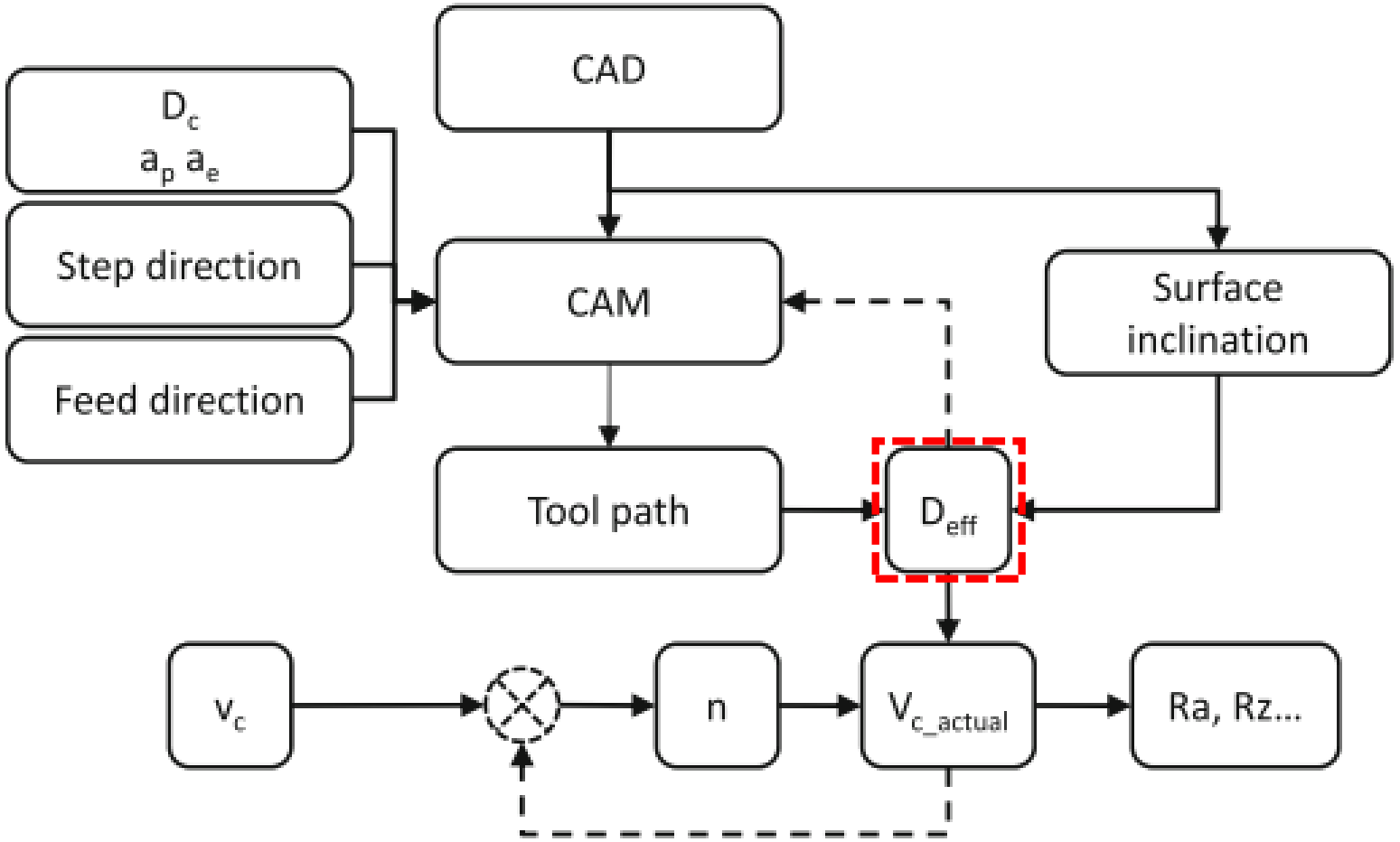


Future Work

- Implementation calculation of working diameter in Matlab,
- In order to develop a fast algorithm, which will be the base of the next steps.






CAD
D_c
a_p a_e
Step direction
Feed direction
CAM
Surface inclination
Tool path
D_{eff}
v_c
n
V_{c_actual}
Ra, Rz...

Thank you for your attention