Effect of cutting edge micro geometry on surface generation in ball end milling

Surface generation in machining processes is affected by a complex interaction between cutting edge and workpiece material, leading to surface artefacts, so that the surface topography deviates considerably from the kinematic one. This paper shows how to model such interaction, taking into account cutting edge topography, material deformation and cutting edge trajectory errors to achieve a reliable prediction of surface topography generation in ball end milling. The model is experimentally validated in upward raster ball end milling of copper and tool steel.