عنوان مقاله:

Replacing friction model with interaction between particles in analyzing orthogonal and rotational cutting processes using SPH method

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خلاصه مقاله:

The cutting tool and work-piece of cutting process are commonly analyzed using Finite Element (FE) and Smooth-Particle Hydrodynamics (SPH) methods respectively. This is identified a compound method in this research. The interaction between cutting tool elements and work-piece particles are modeled as pressure and friction force. The coefficient of friction (CF) between cutting tool and work-piece is the fundamental parameter of friction model. The CF effects on chip morphology and cutting force. In present study, both cutting tool and work-piece of cutting process are analyzed using SPH method without Friction and pressure model (SPH.NO.F). Therefore the pressure and friction force between elements and particles in compound method are replaced with the interaction between particles. The friction in the cutting zones is a physical process that accompanies the cutting but this is not modeled in analyzing of this process, because the cutting tool and work-piece particles interact with each other using the mass and momentum conservation equation. The results of orthogonal cutting process show the chip morphology of SPH.NO.F method is the same as compound method with friction model by CF=۰ and ۰.۱۷. The cutting force of SPH.NO.F method is coincided to experimental results. The cutting force of milling process is investigated using SPH.NO.F and compound method by CF=۰ and ۰.۱۷.

کلمات کلیدی:

replacing friction model, orthogonal cutting, rotational cutting, SPH method

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