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Estimation of workpiece-temperature during ultrasonic-vibration assisted milling considering acoustic softening

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## Highlights

- In the present work analytical and statistical models have been developed for temperature rise in workpiece during UAM process (with axial vibration).
- The developed analytical model integrates the effect of acoustic softening and intermittent cutting with Jaeger's moving heat source model. The developed model considers the effect of all the machining parameters like radial depth of cut, radial feed rate, numbers of tooth on milling tool, amplitude of vibration etc.
- For statistical modeling a quadratic equation has been developed considering radial depth of cut, ultrasonic power, feed per tooth and cutting velocity as process variable.
- Results have showed that the ultrasonic power is the most significant parameter effecting temperature rise.
- Analytical as well as statistical model was validated by the confirmation experiments.

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