

Abstract

The present disclosure relates to a method for controlling a non-sinusoidal hydraulic vibration curve of a mold, belonging to the technical field of metallurgical continuous casting automation. A three-stage linear-sinusoidal composite function is adopted, wherein one oscillation period of a position curve comprises three stages. A first stage is a pseudo-sinusoidal curve obtained by superposition of a standard sinusoidal function having an angular frequency of ω_1 and a linear function having a slope of $-\frac{T_1}{2\pi}a(a-1)$. A second stage is a pseudo-sinusoidal curve obtained by superposition of a standard sinusoidal function having an angular frequency of ω_2 and a linear function having a slope of $\frac{T_1^2}{2\pi} \frac{1-a}{T_2}$ and an offset value of $\frac{T_1^2}{4\pi} \frac{a^2-1}{a}$. A third stage is a pseudo-sinusoidal curve obtained by superposition of a standard sinusoidal function having an angular frequency of ω_1 and a linear function having a slope of $-\frac{T_1}{2\pi}a(a-1)$ and an offset value of $-\frac{T_1^2}{2\pi}a(a^2-1)$, wherein the third stage is connected to the pseudo-sinusoidal curve of the first stage at different sampling times. The method optimizes the non-sinusoidal vibration curve, realizes smooth and continuous variation of a hydraulic cylinder velocity curve and acceleration, and is simple to control, easy to implement, and convenient to operate due to a reduced number of control parameters.