F. Schulze considered the evolution of hypersurfaces in $\mathbb{R}^{n+1}$ with normal speed equal to a power $k > 1$ of the mean curvature. He obtained the levelset solution $u$ of the flow as the $C^0$-limit of a sequence $u^\varepsilon$ of smooth functions solving the regularized levelset equations. We prove a rate for this convergence. Then we triangulate the domain by using a tetraeder mesh and consider continuous finite elements, which are polynomials of degree $\leq 2$ on each tetraeder of the triangulation. We show in the case $n = 1$ (i.e. the evolving hypersurfaces are curves), that there are solutions $u_h^\varepsilon$ of the above regularized equations in the finite element sense, and estimate the approximation error between $u_h^\varepsilon$ and $u$. Our method can be extended to the case $n > 1$, if one uses higher order finite elements.