BLOW-UP SOLUTIONS TO A CERTAIN CLASS OF VOLterra INTEGRAL EQUATIONS

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We present some interesting results [2; 3; 4] from the theory of blow-up solutions to the Volterra integral equation with convolution kernel

\[ u(t) = \int_0^t k(t-s)g(u(s))ds, \quad t \geq 0, \]  

(1)

for which in particular the condition \( g(0) = 0 \) is fulfilled. We show - among other things - how these results can be applied to improve the estimations of the blow-up time of equation (1) in the case where nonlinearity satisfies \( g(0) > 0 \). Equations with such nonlinearities arise in many mathematical models of physical phenomena like shock-waves propagation [1] and classical [7] as well as anomalous diffusion [6; 8]. As an illustrative example to our talk we use the equation related to the formation of shear bands in steel [5]:

\[ v(t) = \xi \int_0^t (v(s) + 1)^\beta \frac{ds}{\sqrt{\pi(t-s)}} \]  

(2)

REFERENCES