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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

$$u(t) = \int_0^t k(t-s)g(u(s))\mathrm{d}s, \quad t \geq 0, \tag{1}$$

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]:

$$v(t) = \xi \int_0^t \frac{(v(s)+1)^\beta}{\sqrt{\pi(t-s)}} ds, \quad \xi > 0, \quad \beta > 1. \tag{2}$$

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