

# LARGE CONTRACTION AND ITS APPLICATIONS TO TOTALLY NONLINEAR DELAY DIFFERENTIAL EQUATIONS

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## Abstract.

In [1, 2], Burton used the idea of large contraction coupled with Krasnoseskii's fixed point theorem and showed that the zero solution of the nonlinear delay differential equation

$$x'(t) = -a(t)x^3(t) + b(t)x^3(t - r(t))$$

is asymptotically stable. In this paper, we use the same theorem in [1, 2] and show the highly nonlinear delay differential equation

$$x'(t) = -a(t)h(x(t)) + G(t, x(t - r(t)))$$

has a periodic solution. Also, under slightly different sufficient conditions, we show the same equation has a positive periodic solution.

## REFERENCES

- [1] Burton, T. A., Liapunov functionals, fixed points and stability by Krasnoseskii's theorem, *Nonlinear studies* 9 (2002), 181-190.
- [2] T.A. Burton, *Stability by Fixed Point Theory for functional Differential equations*, Dover, New York, 2006.

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