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BIFURCATION OF PERIODIC SOLUTIONS TO NONLINEAR  
DISTRIBUTIONAL DIFFERENTIAL EQUATIONS

**Milan Tvrđý**

This is a joint work with Carol Mesquita, Federal University of São Carlos, SP, Brazil.

We consider  $T$ -periodic problem for distributional (measure) differential equation

$$Dx = f(x, t) + g(\lambda, x, t).Du, \quad x(0) = x(T). \quad (\text{P})$$

where  $\Omega \subset \mathbb{R}^n$  and  $\Lambda \subset \mathbb{R}$  are open,  $f : \Omega \times [0, T] \rightarrow \mathbb{R}^n$ ,  $g : \Lambda \times \Omega \times [0, T] \rightarrow \mathbb{R}^n$ ,  $u : [0, T] \rightarrow \mathbb{R}$  is left-continuous on  $(0, T]$  and has a bounded variation on  $[0, T]$ ,  $Dx$  and  $Du$  are distributional derivatives of  $x$  and  $u$ , respectively,  $g(\lambda, x, t).Du$  stands for the distributional product.

By a solution of (P) we mean a couple  $(x, \lambda) \in BV([0, T], \mathbb{R}^n) \times \Lambda$  such that  $x(0) = x(T)$ ,  $x$  is left-continuous on  $(0, T]$ ,  $x(t) \in \Omega$  for  $t \in [0, T]$ , the distributional product  $g(x, \lambda, \cdot).Du$  makes a sense and the differential equality in (P) is satisfied in the distributional sense.

It is assumed that there exists  $x_0 : [0, T] \rightarrow \mathbb{R}^n$  such that the pair  $(x_0, \lambda)$  is a solution of (P) for all  $\lambda \in \Lambda$ . Our goal is to state conditions necessary for that  $(x_0, \lambda_0)$  was the bifurcation point of problem (P).

Milan Tvrđý, Institute of Mathematics, Czech Academy of Sciences  
e-mail : [tvrdy@math.cas.cz](mailto:tvrdy@math.cas.cz)

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