

Differential inequalities and monotonicity methods

(2 hours of lecture)

Let E be an ordered Banach space, the order being given by a closed cone (e.g. $E = R^n$ with $x \leq y$ iff $x_k \leq y_k$ ($k = 1, \dots, n$)). We consider the ordinary differential equation $(*)$ $u'(t) = f(t, u(t))$ for functions u taking values in E . Under appropriate (monotonicity) assumptions for f we use differential inequalities for the qualitative study of $(*)$. This even leads us to existence theorems for $(*)$ (in case of infinite-dimensional E); their proofs sometimes depend on order-theoretical fixed point theorems. Similar results for partial differential equations also will be indicated.