A NAGUMO-TYPE THEOREM ON A CLASS OF SINGULAR FIRST ORDER EQUATIONS

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In 2012, Bacani and Tahara studied the singular first order nonlinear differential equation of the form $t\partial_t u = F(t, x, u, \partial_x u)$, where $F(t, x, u, v)$ is continuous in t and holomorphic in (x, u, v). They proved that a unique solution exists provided that $a(t, x) := \partial_u F(t, x, 0, 0)$ is of order $O(\mu(t))$ and $b(t, x) := \partial_v F(t, x, 0, 0) - \partial_v F(0, x, 0, 0)$ is of order $O(\mu(t))$, as t tends to 0, for some weight function $\mu(t)$.

We revisit this singular equation and present a unique solvability result under weaker assumptions.

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