Article

MR911088 (88j:35054) 35J60 (58G30)

Cheng, Kuo-Shung (RC-NTHU); **Lin, Jenn-Tsann** (RC-NCT-AM)

On the elliptic equations $\Delta u = K(x)u^{\sigma}$ and $\Delta u = K(x)e^{2u}$.

Trans. Amer. Math. Soc. **304** (1987), *no. 2,* 639–668.

The two equations in the title arise in differential geometry; here they are studied in $\mathbf{R}^n$. The unknown function $u(\cdot)$ is locally bounded; the first equation assumes $u(\cdot) \geq 0$. The given function $K(\cdot) \geq 0$ is bounded Hölder continuous; $\sigma > 1$ is a given constant. The cases $n \geq 3$, $n = 2$ and $n = 1$ are handled separately. Earlier existence theorems are quoted and five new ones proved. A number of nonexistence theorems constitute the main results. Three of them almost completely answer the following conjecture: Assume $n \geq 3$, $K(x) \geq k(|x|)$ for $x \in \mathbf{R}^n$ and $\int_0^{\infty} sk(s)\,ds = \infty$; then the first equation would not possess any positive solution in $\mathbf{R}^n$.

Reviewed by *Jean Leray*