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1002-35-92 **Richard S. Laugesen*** (Laugesen@math.uiuc.edu), Department of Mathematics, University of Illinois, Urbana, IL 61801, and **Neil A. Watson** (N.Watson@math.canterbury.ac.nz), Department of Mathematics and Statistics, University of Canterbury, Christchurch, New Zealand.

Another way to say subsolution: the maximum principle and sums of Green functions.

Consider a linear elliptic second order differential operator L with no zeroth order term (for example the Laplacian $L = -\Delta$). If $Lu \leq 0$ in a domain U, then of course u satisfies the maximum principle on every subdomain $V \subset U$.

We prove a converse. Suppose that on every subdomain V, the maximum principle is satisfied by $u + v$ whenever v is a finite linear combination, with positive coefficients, of Green functions with poles outside $\overline{V}$. Then $Lu \leq 0$ on U. The same conclusion holds when $u + v$ is replaced by $u - v$.

This extends a result of Crandall and Zhang for the Laplacian. We also treat the heat equation, improving Crandall and Wang's recent characterization.

The general parabolic equation remains an open problem, as do the (nonlinear) p-Laplace and p-heat equations. Recall that this characterization program began a few years ago when Crandall, Evans and Gariepy characterized subsolutions of the ∞-Laplace equation by means of cone functions v. (Received September 06, 2004)