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**Anders Björn\*** ([anbjo@mai.liu.se](mailto:anbjo@mai.liu.se)), Department of Mathematics, Linköpings universitet,  
SE-586 66 Linköping, Sweden. *The Baernstein problem for  $p$ -harmonic functions.*

In 1998 Al Baernstein asked the following problem: *Is the  $p$ -harmonic measure of  $E$  equal to the  $p$ -harmonic measure of  $\bar{E}$ ?*, when  $E$  is the union of two open arcs on the unit circle in  $\mathbf{R}^2$ .

The  $p$ -harmonic measure of  $E$  is defined to be the Perron solution of  $\chi_E$ , i.e. the solution to the Dirichlet problem for  $p$ -harmonic functions in the unit disc with boundary values  $\chi_E$ . (In this case it is known that the upper and lower Perron solutions agree).

For  $p = 2$  the affirmative answer to Baernstein's problem is trivial, but for  $p \neq 2$  it is far from obvious. In 2006 Björn–Björn–Shanmugalingam made considerable progress showing that the answer is *yes* if  $1 < p < 2$ . Their method cannot be extended to the case  $p > 2$  for several reasons.

In 2009 I used a completely different method to prove that the answer is *yes* for all  $p > 1$ . Kim–Sheffield has also independently shown that the answer is *yes* for all  $p > 1$ .

In this talk I will discuss the history and mathematics of this result. I also intend to discuss related problems and results for Perron solutions. (Received December 10, 2009)