

# Degenerate elliptic operators: Capacity, flux and separation

Derek W. Robinson<sup>1</sup> and Adam Sikora<sup>2</sup>

<sup>1</sup>*Centre for Mathematics and its Applications, Mathematical Sciences Institute, Australian National University, Canberra, ACT 0200, Australia*  
*e-mail: Derek.Robinson@anu.edu.au*

<sup>2</sup>*Department of Mathematical Sciences, New Mexico State University, P.O. Box 30001, Las Cruces, NM 88003-8001, USA*  
*e-mail: sikora@maths.anu.edu.au*

*Communicated by: George Elliott*

Received: August 7, 2007

**Abstract.** Let  $S = \{S_t\}_{t \geq 0}$  be the semigroup generated on  $L_2(\mathbf{R}^d)$  by a self-adjoint, second-order, divergence-form, elliptic operator  $H$  with Lipschitz continuous coefficients. Further let  $\Omega$  be an open subset of  $\mathbf{R}^d$  with Lipschitz continuous boundary  $\partial\Omega$ . We prove that  $S$  leaves  $L_2(\Omega)$  invariant if, and only if, the capacity of the boundary with respect to  $H$  is zero or if, and only if, the energy flux across the boundary is zero.

*AMS Subject Classification:* 35J70, 35Hxx, 35H20, 31C15.