

*Corrigendum and Addendum: Asymptotic
Expansions of Determinants for Families of
Trace Class Operators, Vol. 27 (1978),
449–478*

HAROLD WIDOM

There were two errors toward the end of the paper of the title [3] which led to incorrect formulas for some of the coefficients in the asymptotic expansions. We shall state the corrected formulas and then indicate their proofs (pointing out the errors in [3] along the way). In addition we shall mention some alternative formulas for the coefficients which seem interesting. A reader interested only in the statements of the results need not be familiar with [3].

Let Ω be a compact subset of R^d with C^∞ boundary and let $\sigma(x, \xi)$ be a symbol of order $\omega < -d$. This means that for all multi-indices j, k there are constants $C_{j,k}$ such that

$$(1) \quad |\partial_x^j \partial_\xi^k \sigma(x, \xi)| \leq C_{j,k} (1 + |\xi|)^{\omega - |k|}$$

for all $(x, \xi) \in R^d \times R^d$. We denote by X the operator on $L_2(R^d)$ with kernel

$$\alpha^d k(x, \alpha(x - y))$$

where

$$(2) \quad k(x, z) = (2\pi)^{-d} \int e^{i\xi z} \sigma(x, \xi) d\xi$$

and we denote by P the projection from $L_2(R^d)$ to $L_2(\Omega)$. Our assumptions imply that $Pe^X P$, thought of as an operator on $L_2(\Omega)$, differs from the identity by a trace class operator and so its determinant is defined. The main result of [3] establishes an asymptotic expansion as $\alpha \rightarrow \infty$ of the form

$$\log \det Pe^X P \sim b_0 \alpha^d + b_1 \alpha^{d-1} + b_2 \alpha^{d-2} + \dots$$

and evaluates the coefficients up to b_2 . These are given on pages 476–477, the expression for b_2 being incorrect. The formulas should read (explanation of notation follows)