

**CORRIGENDUM ON THE PAPER: 'LOWER BOUNDS FOR THE INFIMUM OF THE SPECTRUM OF THE SCHRÖDINGER OPERATOR IN  $\mathbb{R}^N$  AND THE SOBOLEV INEQUALITIES' PUBLISHED IN JIPAM, VOL. 3, NO. 4. (2002), ARTICLE 63**

**E.J.M. VELING**

Delft University of Technology  
Faculty of Civil Engineering and Geosciences  
Section for Hydrology and Ecology  
P.O. Box 5048, NL-2600 GA Delft  
The Netherlands.

*EMail:* [Ed.Veling@CITG.TUdelft.nl](mailto:Ed.Veling@CITG.TUdelft.nl)



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## Abstract

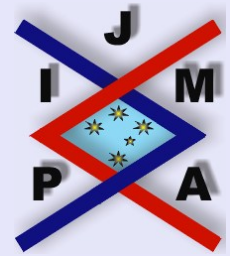
This paper is a corrigendum on a paper published in an earlier volume of JIPAM, 'Lower Bounds for the Infimum of the Spectrum of the Schrödinger Operator in  $\mathbb{R}^N$  and the Sobolev Inequalities' published in JIPAM, vol. 3, no. 4. (2002), Article 63. It concerns of a number of misprints.

*2000 Mathematics Subject Classification:* 26D10, 26D15, 47A30.

*Key words:* Optimal lower bound, infimum spectrum Schrödinger operator, Sobolev inequality.

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# 1. Results

The following list of misprints have been brought to the attention of the author by the review in *Mathematical Reviews* #1923362 by Jan Kříž. It appeared that these misprints had crept in during the process of text-editing of an earlier concept.

1. Page 2, formula (1.4) (definition of the form domain  $Q(h)$ ):

$$Q(h) = H^1(\mathbb{R}^N) \cap \{u \mid u \in L^2(\mathbb{R}^N), \quad q_+^{1/2} \in L^2(\mathbb{R}^N)\}.$$

to be replaced by [see second condition]

$$Q(h) = H^1(\mathbb{R}^N) \cap \{u \mid u \in L^2(\mathbb{R}^N), \quad q_+^{1/2}u \in L^2(\mathbb{R}^N)\}.$$

2. Page 3, brackets between formulas (1.12) and (1.13): the line with

$$(P = 1/\theta, Q = 1/(1 - \theta), a = \eta \|\nabla w\|_2^{2\theta}, b = \|w\|_2^{2\theta}/\eta).$$

to be replaced by [see exponent in expression for  $b$ ]

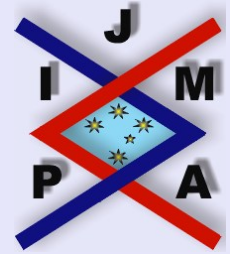
$$(P = 1/\theta, Q = 1/(1 - \theta), a = \eta \|\nabla w\|_2^{2\theta}, b = \|w\|_2^{2(1-\theta)}/\eta).$$

3. Page 4, formula (1.22), integral in the numerator:

$$l(N, \theta) = \inf_{q_- \in L^p(\mathbb{R}^N)} \inf_{u \in H^1(\mathbb{R}^N)} \frac{\|\nabla u\|_2^2 + \int_{\mathbb{R}^N} q|u|^2 dx}{\|u\|_2^2} \|q_-\|_p^{-1/(1-\theta)}.$$

to be replaced by [see  $|u|^2$  in integrand in integral in numerator]

$$l(N, \theta) = \inf_{q_- \in L^p(\mathbb{R}^N)} \inf_{u \in H^1(\mathbb{R}^N)} \frac{\|\nabla u\|_2^2 + \int_{\mathbb{R}^N} q|u|^2 dx}{\|u\|_2^2} \|q_-\|_p^{-1/(1-\theta)}.$$



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4. Page 5, formulas (1.28) and (1.29), integrals  $(0, \infty)$  in the numerators:

$$\inf_{q_- \in L^p(\mathbb{R}^+)} \inf_{u \in \mathcal{D}(T_0)} \frac{\|u'\|_2^2 + \int_0^\infty q|u|_2^2 dx}{\|u\|_2^2} \|q_-\|_p^{-2p/(2p-1)} = l(1, 1/(2p)),$$

$$\inf_{q_- \in L^p(\mathbb{R}^+)} \inf_{u \in \mathcal{D}(T_{\pi/2})} \frac{\|u'\|_2^2 + \int_0^\infty q|u|_2^2 dx}{\|u\|_2^2} \|q_-\|_p^{-2p/(2p-1)} = 2^{2/(2p-1)} l(1, 1/(2p)).$$

to be replaced by [see  $|u|^2$  in integrand integral numerator], respectively

$$\inf_{q_- \in L^p(\mathbb{R}^+)} \inf_{u \in \mathcal{D}(T_0)} \frac{\|u'\|_2^2 + \int_0^\infty q|u|^2 dx}{\|u\|_2^2} \|q_-\|_p^{-2p/(2p-1)} = l(1, 1/(2p)),$$

$$\inf_{q_- \in L^p(\mathbb{R}^+)} \inf_{u \in \mathcal{D}(T_{\pi/2})} \frac{\|u'\|_2^2 + \int_0^\infty q|u|^2 dx}{\|u\|_2^2} \|q_-\|_p^{-2p/(2p-1)} = 2^{2/(2p-1)} l(1, 1/(2p)).$$

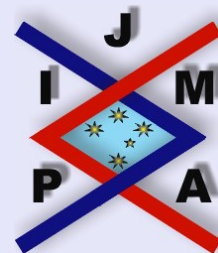
5. Page 7, Lemma 2.1: “defined in (6)” should be replaced by “defined in (1.6)”.

6. Page 9, formula (2.15):

$$h(u, u) = -b^Q/Q = -(1 - \theta)\theta^{\theta/(1-\theta)} \lambda_{N,\theta}^{-2/(1-\theta)} \|q_-\|_p^{1/(1-\theta)} \|u\|_2^2,$$

to be replaced by [first equality sign to be replaced by inequality sign]

$$h(u, u) \geq -b^Q/Q = -(1 - \theta)\theta^{\theta/(1-\theta)} \lambda_{N,\theta}^{-2/(1-\theta)} \|q_-\|_p^{1/(1-\theta)} \|u\|_2^2,$$



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7. Page 10, formula (2.25), integral in the numerator:

$$\frac{\|u'_j\|_2^2 + \int_{-\infty}^{\infty} q|u_j|_2^2 dx}{\|u_j\|_2^2} \|q_j\|_1^{-2} = -(1 + 1/j)^2/4 > -1/4 = l(1, 1/2).$$

to be replaced by [see  $q_j$  and  $|u_j|^2$  in integrand integral numerator]

$$\frac{\|u'_j\|_2^2 + \int_{-\infty}^{\infty} q_j|u_j|^2 dx}{\|u_j\|_2^2} \|q_j\|_1^{-2} = -(1 + 1/j)^2/4 > -1/4 = l(1, 1/2).$$

Moreover, corrections have to be made in the following lines.

1. Page 1, Abstract, line 4: change

“ $\Lambda_{N,\theta}(\nu) = \|\nabla v\|_2^\theta \|v\|_2^{1-\theta} \|v\|_r^{-1}$ , with  $\nu$  element of the Sobolev space  $H^1(\mathbb{R}^N)$ ”, into “ $\Lambda_{N,\theta}(v) = \|\nabla v\|_2^\theta \|v\|_2^{1-\theta} \|v\|_r^{-1}$ , with  $v$  element of the Sobolev space  $H^1(\mathbb{R}^N)$ ”.

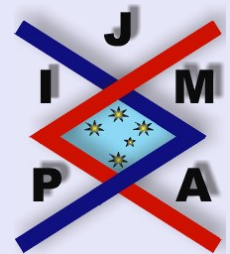
2. Page 1, line -2 : change “ $q = q_+ + q_-$ ” into “ $q = q_+ - q_-$ ” .

3. Page 6, line 12: change “ $l(3, 3/4) = -1.750180_{10^{-4}}$ ” into “ $l(3, 3/4) \simeq -1.750180_{10^{-4}}$ ”.

4. Page 8: label (2.4) refers the expression, one line higher; label (2.5) refers to the expression two lines higher.

5. Page 9: change formula (2.16) “ $q = q_-$ ” into “ $q = -q_-$ ”.

6. Page 11, line 9: change “side of (31)” into “side of (1.31)”.



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