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KODAI MATH. J.
14 (1991), 310—311

CORRECTION TO: "A VARIFOLD SOLUTION TO THE NONLINEAR WAVE EQUATION OF MOTION OF A VIBRATING MEMBRANE"

(Kodai Mathematical Journal vol. 9 (1986), pp 84-116.)

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On page 94 of the above mentioned paper we gave equality

$$\lim_{m\to\infty}\int_0^T D_t^2\phi(t)dt\int_{\Omega\times\boldsymbol{R}\times G}\phi_k(x)y\,\nu_{n+1}(S)dV^m(t;x,y,S) \tag{4.21}$$

$$=\int_0^T D_t^2\phi(t)dt\int_{\Omega\times\boldsymbol{R}\times G}\phi_k(x)y\nu_{n+1}(S)dV(t;x,y,S)$$

But the proof of this was not valid. It was based on assertion that $\phi_j(x)y\nu_{n+1}(S)\in C_0^\infty(\Omega\times\boldsymbol{R}\times G)$, which is obviously false because the support of $\phi_j(x)y\,\nu_{n+1}(S)$ is not compact.

In order to prove (4.21) we need to show "tightness" of the sequence of measures $\{\nu_{n+1}(S)|y|V^m(t)\}_{m=1}^\infty$, i.e., for any $\varepsilon>0$ there exists a positive K such that for any $m=1, 2, \cdots$

$$\int_{\Omega\times[K,\infty)\times G}|y|\nu_{n+1}(S)\,dV^m(t,x,y,S)<\varepsilon\,. \tag{T.1}$$

Let us prove (T.1). Note that we have, for any $m=1, 2, \cdots$,

$$\int_{\Omega\times\boldsymbol{R}\times G}|y|^{n/(n-1)}\nu_{n+1}(S)\,dV^m(t,x,y,S)=\int_\Omega|u^m(t,x)|^{n/(n-1)}dx\,.$$

The Sobolev-De Giorgi inequality gives that

$$\left(\int_\Omega|u^m(t,x)|^{n/(n-1)}dx\right)^{n/(n-1)}\leqq C\int_\Omega|Du^m(t,x)|dx\,.$$

Combining these with (4.8) on page 91, we obtain

$$\int_{\Omega\times\boldsymbol{R}\times G}|y|^{n/(n-1)}\nu_{n+1}(S)\,dV^m(t,x,y,S)\leqq M\,, \tag{T.2}$$

where M is a constant which may be different from that of (4.9) on page 91.

Received November 8, 1990.

For any $\varepsilon>0$ choose K so large that $K^{-1/(n-1)}M<\varepsilon$. Then we have from (T.2) that

(T.3)
$$\int_{\Omega\times[K,\infty)\times G}|y|\nu_{n+1}(S)\,dV^{m}(t, x, y, S)$$
$$<K^{-1/(n-1)}\int_{\Omega\times\boldsymbol{R}\times G}|y|^{n/(n-1)}\nu_{n+1}(S)\,dV^{m}(t, x, y, S)\leqq K^{-1/(n-1)}M<\varepsilon$$

Therefore, tightness has been proved.

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