KOSHI MASALASI YECHIMINI REGULYARLASHTIRISH

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ANNOTATSIYA

Bu ishda momentli elastikliklik nazariyasi tenglamalari sistemasi yechimini fazoda yechim va uning kuchlanishi soha chegarasining musbat o'lchovli qismida berilganda sohaning ichiga topish masalasi qaraladi. Bunday masalaga Koshi masalasi deyiladi. Qaralayotgan masalaning yechimi mavjudligi kriteriyasi keltiriladi.

Kalit so'zlar: Momentli elastikliklik nazariyasi, Karleman funksiyasi, Karleman matritsasi, Somilion-betti, Koshi masalasi.

KIRISH

Bu ishda asosan chegaralanmagan sohada mos ravishda chegaralanmagan yechim holida Karleman matritsasini qurish yo'llari o'rganilgan. Karleman matritsasini qurishda bundan oldin qaralgan holdan farqli ravishda maxsuslik tartibi katta bo'lgan yadro holida Karleman matritsasini mustaqil ravishda qurildi va shu holda regulyarlashgan yechim bilan aniq yechim orasidagi farq baholangan.

Usullari.

$U(y)$ va $T(\partial y,n)U(y)$ o'rniga S da ularning taqribiy qiymatlari $f_\delta(y)$ va $g_\delta(y)$ lar berilgan bo'lsin,

$$\max_S |U(y)-f_\delta(y)|+\max_S |T(\partial y,n)U(y)-g_\delta(y)|<\delta, \qquad 0<\delta<1.$$

Quyidagi funksiyani qurib olamiz

$$U_{\sigma\delta}(x)=\int_S [\Pi(y,x,\sigma)g_\delta(y)-f_\delta(y)\{T(\partial y,n)\Pi(y,x,\sigma)\}]ds_y, \qquad x\in D.$$

Quyidagi teorema o'rinli

1-teorema. $U(x)\in A_\rho(D)$ bo'lib, (3) shartni qanoatlantirsin. U holda

$$\left|U(x)-U_{\sigma\delta}(x)\right|\le M^{1-\frac{x_2}{h}}C_\rho(x)\delta^{\frac{x_2}{h}}\left[\ln\left(\frac{M}{\delta}\right)\right]^3, \qquad x\in D,$$

bunda $\sigma=h^{-1}\ln\frac{M}{\delta}$, $C_\rho(x)=\int\limits_{\partial D}\frac{ds_y}{r^2}$

Natija. Quyidagi limitik tengliklar

$$\lim_{\sigma\to\infty}U_\sigma(x)=U(x),\ \lim_{\delta\to 0}U_{\sigma\delta}(x)=U(x)$$

D dagi ixtiyoriy kompakt sohada tekis bajariladi.

Yuqoridagi natijalarni bir muncha umumlashtirish mumkin. S bo‘lak quyidagi shartni kanoatlantirsin:

$$\int\limits_S \exp\left(-b_0 ch\rho_0\left|y^1\right|ds_y<\infty, \quad 0<\rho_0<\rho\right.$$

$U(x)\in A_\rho(D)$ bo‘lib, quyidagi chegaraviy o‘sish shartini qanoatlantirsin

$$\left|U(y)\right|+\left|T(\partial y,n)U(y)\right|\le C\exp\left(a\cos\rho_1\left(y_2-\frac{h}{2}\right)\exp\rho_1\left|y_1\right|\right),\ y\in\partial D$$

S da berilgan $f_\delta(y),\ g_\delta(y)$ funksiyalar quyidagi shartlarni qanoatlantirsin:

$$\left|f_\delta(y)\right|+\left|g_\delta(y)\right|\le\exp\left(a\cos\rho_1\left(y_2-\frac{h}{2}\right)\cdot\exp\rho_1\left|y_1\right|\right),\ y\in S,$$

$$\left|U(y)-f_\delta(y)\right|+\left|T(\partial y,n)U(y)-g_\delta(y)\right|\le\delta\exp\left(a\cos\rho_1\left(y_2-\frac{h}{2}\right)\cdot\exp\rho_1\left|y_1\right|\right),\ y\in S,$$

bunda $0<\delta<1,\quad 0<\rho_1<\rho,\quad a\ge 0$. Olamiz

$$K(\omega)=\exp\left(\sigma\omega-bchi\rho_1\left(\omega-\frac{h}{2}\right)-b_1chi\rho_0\left(\omega-\frac{h}{2}\right)\right],$$

bunda $\omega=i\sqrt{u^2+\alpha^2}+y_2,\ \ 0<x_2<h,\ \ b\ge 0,\ b_1\ge b_0\left(\cos\rho_0\frac{h}{2}\right)^{-1}+\varepsilon,\ \varepsilon>0,$

$$\alpha=\left|y_1-x_1\right|,\ b=2a\exp\rho_1\left|x_1\right|,\qquad \sigma=h^{-1}\ln\delta^{-1}.$$

Bu shartlar ostida quyidagi belgilashni olamiz

$$U_{\sigma\delta}(x)=\int\limits_S\left[\Pi(y,x,\sigma)g_\delta(y)-f_\delta(y)\{T(\partial y,n)\Pi(y,x,\sigma)\}\right]ds_y,\ x\in D$$

2-teorema. Yuqoridagi shartlar bajarilganda quyidagi tengsizlik o‘rinli bo‘ladi

$$\left|U(x)-U_{\sigma\delta}(x)\right| \leq C(x)\delta^{\frac{ч_2}{h}}\left(\ln\frac{1}{\delta}\right)^3 \cdot \exp\left(2a\cos\rho_1\left(x_2-\frac{h}{2}\right)\cdot\exp\rho_1|x_1|\right), x\in D$$

bunda $C(x)=C(\rho)\int\limits_{\partial D}\frac{1}{r^2}\exp(-b_0 ch\rho_0\alpha)\exp\left[\frac{b}{2}\cos\rho_1\frac{h}{2}\left(\exp\rho_1(|y_1|-|x_1|)-\exp\rho_1|y_1-x_1|\right)\right]ds_y$

FOYDALANILGAN ADABIYOTLAR RO‘YXATI: (REFERENCES)

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