KOMPLEKS O'ZGARUVCHILI DARAJALI ISHLAB CHIQARISH FUNKSIYASINING DARAJA KO'RSATKICHI BO'YICHA IQTISODIY MA'NOSI

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Kompleks o'zgaruvchili darajali ishlab chiqarish funksiyalarining umumiy ko'rinishi quyidagicha bo'ladi: $Q = aR^b$ (1)

Kompleks o'zgaruvchili darajali ishlab chiqarish funksiyamizdagi ishlab chiqarish natijasi Q ni quyidagi ikki o'zgaruvchi orqali ifodalaymiz: $Q = G + iC$, bu yerda $G -$ yalpi daromad, $C -$ mahsulot tannarxi.

$R = K + iL$, bu yerda $K -$ kapital resurslari, $L -$ mehnat resurslari.

$$G + iC = a(K + iL)^b, \qquad (2)$$

bu yerda $C > 0, K > 0, L > 0, a > 0, b > 0$. Bu funksiya chiziqli emas hisoblanadi va ishlab chiqarish resurslarining kompleks o'zgaruvchilarini eksponensial forma orqali ifodalash mumkin:

$$G + iC = a(R^b e^{ib\theta}),$$ bu yerda $R = \sqrt{K^2 + L^2}, \theta = arctg\left(\frac{L}{K}\right) + 2\pi k, k \in Z, K > 0$

Eksponensial formadagi bu model ustida bir necha matematik amallarni bajarib, quyidagi ko'rinishga keltirish mumkin:

$$\sqrt{G^2 + C^2} e^{iarctg\left(\frac{C}{G}\right)} = a(\sqrt{K^2 + L^2})^b e^{ibarctg\left(\frac{C}{G}\right)} \qquad (3)$$

Bu tenglikdan daraja ko'rsatkichi b quyidagilarga teng:

$$b = \frac{arctg\frac{C}{G} + \pi n}{arctg\frac{L}{K}}, \qquad n = \begin{cases} 0, \text{ agar } G \ge 0 \\ 1, \text{ agar } G < 0 \end{cases}, \qquad (4)$$

b daraja ko'rsatkichi yuqorida ko'rsatilgani kabi musbatdir. U holda $(-G)=C$ nuqtada o'zing qabul qilishi mumkin bo'lgan eng yuqori qiymatiga erishadi va buni (6) tenglik orqali ko'rsatamiz:

$$b_4 = \frac{3\pi}{4arctg\frac{L}{K}} \qquad (5)$$

Ushbu daraja ko'rsatkichining qabul qilishi mumkin bo'lgan qiymatlar sohasi $(a>0, b>0)$ ni hisobga olgan holda quyidagi ko'rinishda bo'ladi: $0<b\le b_4 = \dfrac{3\pi}{4arctg\frac{L}{K}}$ (6)

Bizni foydaga ham zararga ham erishtirmaydigan, ya'ni $G(b)=0$ bo'ladigan $b$ning qiymatini (6) tenglikdan topish oson: $b_2 = \dfrac{\pi}{2arctg\frac{L}{K}}$ (7)

Endi b parametr bo'yicha G va C funksiya ekstrimumlarini topamiz. Ularni xususiy hosilalarini b parametr bo'yicha hisoblab, olingan natijani beramiz. Bunda yalpi foyda $G(b)$ o'zining eng yuqori qiymatini qabul qiladi:

$$b = \frac{arctg\dfrac{\ln\sqrt{K^2+L^2}}{arctg\frac{L}{K}} + \pi n}{arctg\frac{L}{K}}$$

. Ishlab chiqarish xarajatlari $C(b)$ funksiyasi ham o'zining maksimal qiymatini qabul qiladi:

$$b = \frac{arctg\left(-\dfrac{arctg\frac{L}{K}}{\ln\sqrt{K^2+L^2}}\right) + \pi n}{arctg\frac{L}{K}}$$

$n=0$ bo'lganda $G(b)$ o'zining eng kata qiymatini qabul qiladi, $C(b)$ esa bu sohadan chiqib ketadi. $n=1$ bo'lganda esa $G(b)$ o'zining qiymatlar sohasidan chiqib ketadi, $C(b)$ esa bu oraliqda o'zining maksimal qiymatiga erishadi:

$$b_1 = \frac{arctg \dfrac{\ln\sqrt{K^2+L^2}}{arctg \dfrac{L}{K}}}{arctg \dfrac{L}{K}} \qquad (10);$$

$$b = \frac{arctg\left(-\dfrac{arctg \dfrac{L}{K}}{\ln\sqrt{K^2+L^2}}\right)+\pi}{arctg \dfrac{L}{K}} \qquad (11)$$

Olingan natijalardan quyidagi xulosalarni berish mumkin:

$b \in (0, b_1) -$ ishlab chiqarish samarali, shuningdek, $C\uparrow G\uparrow Q\uparrow$;

$b = b_1 -$ G foyda o'zining eng katta qiymatiga erishadigan optimal ishlab chiqarish nuqtasi;

$b \in (b_1;1) -$ ishlab chiqarish samarali. $G\downarrow C\uparrow Q\uparrow$;

$b = 1 -$ keskin o'zgaradigan nuqta. Bunda (1) formuladan ko'rinadiki, $G = aK, C = aL.$ $b \in (1; b_Q) - G\downarrow Q\uparrow$.

$b = b_2 -$ foydasiz ishlab chiqarish nuqtasi(iqtisodiy analizdan ma'lumki, bu nuqta "kritik nuqta"), $G = 0$. $Q = C$.

$b \in (b_2; b_3) -$ samarasiz ishlab chiqarish, $G < 0$, ammo $|G| < C$, $C\uparrow, Q\downarrow$.

$b = b_3 -$ zararning maksimal nuqtasi, xarajatlar eng katta qiymatni qabul qiladigan ekstrimum nuqta, $G < 0$, $|G| < C$.

$b \in (b_3; b_4) -$ ishlab chiqarish nihoyatda samarasiz. $G\downarrow, C\downarrow, Q\downarrow$.

$b = b_4 -$ ishlab chiqarishning to'xtash nuqtasi. $|G| = C, Q = 0$.

Foydalanilgan adabiyotlar

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ASYMPTOTIC REPRESENTATION OF BLOW-UP MODES OF PARABOLIC EQUATION NOT IN DIVERGENCE FORM WITH SOURCE

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In this work we consider in $Q=\{(t,x):\ t>0,\ x\in R^N\}$ parabolic equation of nonlinear equation not in divergence form with source

$$\frac{\partial u}{\partial t}=u^{\alpha}\nabla\left(u^{m-1}\left|\nabla u^{k}\right|^{p-2}\nabla u\right)+u^{\beta} \qquad (1)$$

$$u(0,x)=u_0(x),\ x\in R^N \qquad (2)$$

where k,p,m,α,β the numerical parameters, $\nabla(\cdot)=grad_x(\cdot)$, t and $x\in R^N$ -respectively, the temporal and spatial coordinates, $u=u(x,t)\geq 0$ are the solution. The numerical parameter n characterizes the variable source of the nonlinear medium. The equation (1) describes the process of polytrophic filtration in a nonlinear two-componential medium with source. In the equation $u\geq 0$-means the pressure, $u^{\alpha}\nabla\left(u^{m-1}\left|\nabla u^{k}\right|^{p-2}\nabla u\right)$-filtration flow, u^{β} -power volume filtration source.

The equation (1) describes many physical phenomena [1-6]. In particular, at $\alpha=2$, $m=1$, $p=2$, $n=0$ for single equation in (1) it is encountered in plasma physics [6].

Theorem 1. A weak solution of the problem (1)-(2) has the following asymptotic form: