KOMPYUTER TEXNOLOGIYALARI YORDAMIDA TEBRANMA XARAKAT QILAYOTGAN TIZIMNI TADQIQ QILISH.

Xo‘jaaxmedova X. S.,
“Materialshunoslik va mashinasozlik” kafedrasi katta o‘qituvchisi
Bekmurzaev N.X., texnika fanlari nomzodi, Toshkent davlat transport universiteti “Materialshunoslik va mashinasozlik” kafedrasi dotsenti
Qo‘chqorov L.A.,
“Materialshunoslik va mashinasozlik” kafedrasi assistenti
Rahimov U. T.,
“Materialshunoslik va mashinasozlik” kafedrasi assistenti
Erkinov S.M., Mexatronika va robototexnika kafedrasi assistenti
Islom Karimov nomidagi Toshkent davlat texnika universiteti

Annotatsiya. Ushbu maqolada texnikada uchraydigan muayyan masalalarani echishda, sistema nuqtalariga ta’sir etuvchi qaytaruvchi kuchdan tashqari, muhitning qarshilik kuchini e’tiborga olish sistemaning muvozanat holati yakinidagi kichik tebranishlarini o‘rganishdan iborat.

Kalit so‘zlar: qarshilik kuchi, o‘zgarmas qarshilik koeffitsienti, dissipativ funksiya.

Abstract. In this article, in solving certain technical problems, in addition to the restoring force acting on the points of the system, taking into account the resistance force of the environment is the study of small fluctuations of the system near the equilibrium state.

Key words: resistance force, constant resistance coefficient, dissipative function.

Malakali kadrlarni tayyorlash, ularni zamon talabiga mos etuk mutaxasislar qilib tarbiyalash hozirgi kun talabi bo‘lib kelmoqda. Kadrlar tayyorlash milliy dasturida ham bu narsa alohida ta’kidlab o‘tilgan. Zamon talabiga mos kadrlarni tayyorlashda kompyuter texnologiyalarni o‘rni beqiyosdir. SHularni inobatga olib, ta’lim tizimida zamonaviy kompyuter texnologiyalarini qo‘llash va ulardan unumli foydalanish hozirgi kunda dolzarb vazifalardan biri bo‘lib kelmoqda. Texnika

sohasida va o‘quv jarayonlarida ko‘plab paket dasturlardan foydalanib kelinmoqda. Quyida kichik tebranma harakat qilayotgan tizimning tebranish jarayoni MATLAB dasturida ishlab chiqilgan.

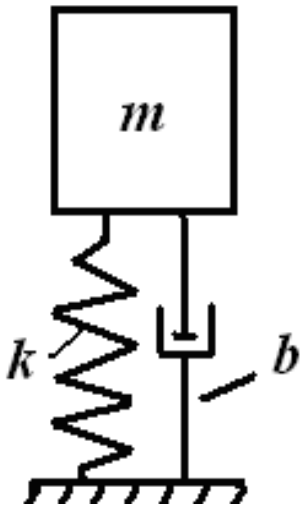
Texnikada uchraydigan muayyan masalalarani echishda, sistema nuqtalariga ta’sir etuvchi qaytaruvchi kuchdan tashqari, muhitning qarshilik kuchini e’tiborga olishga to‘g‘ri keladi (1-rasm). Bunday sistemaning muvozanat holati yakinidagi kichik tebranishlarini o‘rganishda sistemaning har bir nuqtasiga ta’sir etuvchi $\overline{R_k}$ qarshilik kuchini mazkur nuqtalarning tezliklariga mutanosib deb qaraymiz;

$$\overline{R_k} = -\mu_k \overline{v_k} \qquad (1)$$

Bunda $\mu_л$ - o‘zgarmas qarshilik koeffitsienti. Manfiy ishora qarshilik kuchi tezlikka teskari yo‘nalganligini ifodalaydi. Qarshilik kuchiga mos bo‘lgan umumlashgan kuch

$$Q^R = \sum \overline{R_k} \cdot \frac{\partial \overline{r_k}}{\partial q} \qquad (2)$$

formuludan aniqlanadi.



1-rasm. Bir massali dinamik tizim modeli.

Dissipativ funksiyaning fizik ma’nosini aniqlash maqsadida qaralayotgan sistema uchun Lagranjning ikkinchi xil tenglamalarini yozamiz:

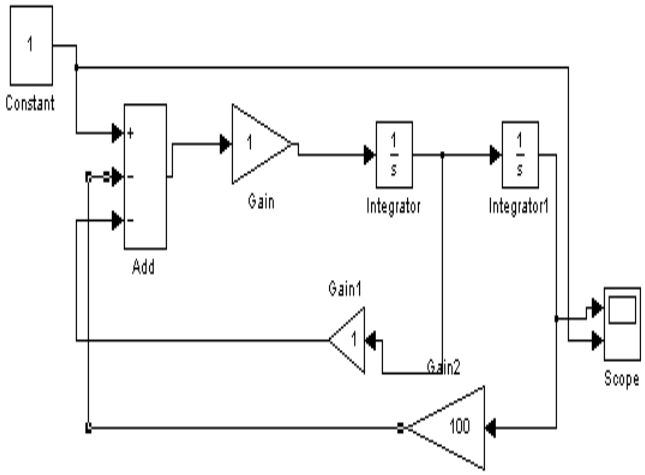
$$\frac{d}{dt}\frac{\partial T}{\partial \dot{q}} - \frac{\partial T}{\partial q} = -\frac{\partial П}{\partial q} - \frac{\partial Ф}{\partial \dot{q}} \qquad (3)$$

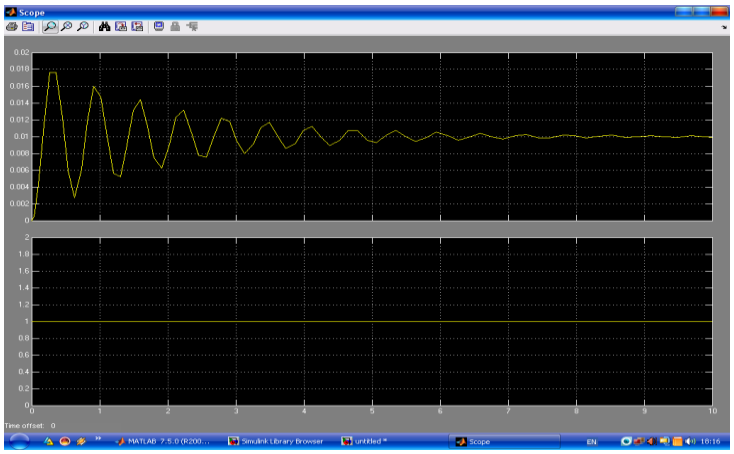
Erkinlik darajasi bitta bo‘lgan sistema uchun uning kichik tebranma harakati differensial tenglamasi (3) ko‘ra quyidagicha yoziladi.

$$a\ddot{q}+\mu\dot{q}+cq=0$$

yoki $$\ddot{q}+2b\dot{q}+k^2q=0$$

Quyida so‘nuvchi tebranma harakat kilayotgan tizimning tebranish blok – modeli MATLAB dasturi Simulink bibliotekasida ishlab chiqilgan. Bibiliotekadan kerakli bloklarni tanlab, chiquvchi va kiruvchi signallarni tutashtirish orqali blok-model yaratiladi. Scope blogidan esa tebranish fazasini ko‘rish mumkin. Bunda talabalar tebranma harakat qilayotgan tizimni qarshilik va qaytaruvchi kuchlarini qiymatini o‘zgartirib Amplituda-chastolali xususiyatlarni (ACHX) ham ko‘rish mumkin. Bu erda, *b*-demfir (koeffitsient demfirovaniya)





Joriy yildan TAYLQEI, “Yo‘l quriish mashinalari va jihozlari ” kafedrasida “Modellashtirish asoslari” fani bo‘yicha amaliy mashg‘ulotlarni bajarishga *Matlab Simulink* dasturi joriy qilindi. Talabalar olgan bilim va ko‘nikmalarini, kurs

loyihasi, bitiruv malakaviy ishlari va magistrlik dissertatsiyalarini bajarishda qo‘llab kelmoqdalar.

Adabiyot

1. Kayumjonovich, T. N. (2022). DEVELOPMENT OF A METHOD FOR SELECTING THE COMPOSITIONS OF MOLDING SANDS FOR CRITICAL PARTS OF THE ROLLING STOCK. Web of Scientist: International Scientific Research Journal, 3(5), 1840-1847.
2. Zhurakulovich, A. S., & Shavkatovna, V. D. (2021). Investigation of heat load parameters of friction pairs of vehicle braking systems. Web of Scientist: International Scientific Research Journal, 2(12), 483-488.
3. Азимов, Ш. И. М. М., & Валиева, Д. Ш. (2021). АНАЛИЗ ПРОЧНОСТНЫХ ХАРАКТЕРИСТИК ЗУБЧАТЫХ ПЕРЕДАЧ ПРИВОДА ПОДАЧИ РАБОЧЕГО ОРГАНА ШТРИПСОВОГО СТАНКА. Scientific progress, 2(2), 1470-1472.
4. Ruzmetov, Y., & Valieva, D. (2021). Specialized railway carriage for grain. In E3S Web of Conferences (Vol. 264, p. 05059). EDP Sciences.
5. Urazbayev, T. T., Tursunov, N. Q., Yusupova, D. B., Sh, V. D., Erkinov, S. M., & Maturaev, M. O. (2022). RESEARCH AND IMPROVEMENT OF THE PRODUCTION TECHNOLOGY OF HIGH-MANGANESE STEEL 110G13L FOR RAILWAY FROGS. Web of Scientist: International Scientific Research Journal, 3(6), 10-19.
6. Sh, V. D., Erkinov, S. M., Kh, O. I., Zh, A. S., & Toirov, O. T. (2022). IMPROVING THE TECHNOLOGY OF MANUFACTURING PARTS TO REDUCE COSTS. Web of Scientist: International Scientific Research Journal, 3(5), 1834-1839.
7. Sharifxodjaeva, X. A., Erkinov, S. M., Sh, V. D., & Kuchkorov, L. A. (2022). ON THE BASIS OF COMPUTER SIMULATION OF THE DESIGN OF RIFTS FOR STEEL CASTINGS OF COMPLEX CONFIGURATION. Web of Scientist: International Scientific Research Journal, 3(5), 1991-1995.
8. Мелибоева, М. А., Валиева, Д. Ш., Эркинов, С. М., & Кучкоров, Л. А. (2022). СОВЕРШЕНСТВОВАНИЕ ТЕХНОЛОГИИ ИЗГОТОВЛЕНИЯ ДЕТАЛИ ДЛЯ СНИЖЕНИЯ СЕБЕСТОИМОСТИ. Oriental renaissance: Innovative, educational, natural and social sciences, 2(5-2), 796-802.
9. Riskulov, A. A., Tursunov, N. K., Avdeeva, A. N., Sh, V. D., & Kenjayev, S. N. (2022). Special alloys based on beryllium for machine-building parts. Web of Scientist: International Scientific Research Journal, 3(6), 1321-1327.
10. Kayumjonovich, T. N., Komissarov, V. V., & Pirmukhamedovich, A. S. (2022). EXPERIMENTAL INVESTIGATIONS SLIPPING IN A FRICTION PAIR OF STEEL MATERIALS. Web of Scientist: International Scientific Research Journal, 3(6), 1062-1073.
11. Kayumjonovich, T. N., Tileubaevich, U. T., & Nematullayevich, K. S. (2022). CHANGE IN THE MICROSTRUCTURE OF HADFIELD STEEL AFTER HEAT TREATMENT. Web of Scientist: International Scientific Research Journal, 3(6), 141-146.