به نام آنکه یادش آرامش بخش دلهاست

کارگاه آشنایی با اصول مقاله نویسی علمی

دانشگاه شهید چمران اهواز

هفته پژوهش و فناوری گرامی باد

ارائه دهنده:

حمید محمدصدیقی

استادیار گروه مهندسی مکانیک

آذرماه ۱۳۹۵

مطالب مورد بحث

- چرا پژوهش؟
- ساختار مقاله علمی
- داوری همتا
- تعارض منافع
- اعتبار مجلات
- شاخص هرش
- دسترسی به پایگاه های استنادی

چرا پژوهش؟

تحقیق و پژوهش	سهیم بودن در علم بشری، جنبه نوآوری عملی و یا تئوری
چاپ نتایج تحقیقهای علمی	موتور کلیدی و اصلی پیشرفت در جامعه علمی و دانشگاهی و ارزیابی فعالیت علمی
مقاله علمی	نتیجه منطقی یک پژوهش ارزشمند، عمیق و هدفمند
چاپ مقاله	مقبولیت پژوهش تحقیقاتی در جامعه علمی و ساماندهی افکار و ساختار دانش پژوهی

چرا پژوهش؟


نگارش مقاله
شرکت در همایشها
کار گروهی
مشورت با افراد برجسته
تکرار پژوهش
مقاله خواندن

مطالب مورد بحث

- چرا پژوهش؟
- ساختار مقاله علمی
- داوری همتا
- تعارض منافع
- اعتبار مجلات
- شاخص هرش
- دسترسی به پایگاه های استنادی

ساختار مقاله علمی

انواع مقاله

- یادداشت فنی – (Technical Note)
- مقاله اصیل – (Original Article)
- مقاله مروری – (Review Article)
- نامه به سردبیر – (Letter to the editor)
- مقاله علمی– ترویجی، الحاقی، ویدئویی و ...

IMRAD Method

ساختار مقاله علمی

ویژگیهای عنوان مقاله

- واضح و بی نیاز از توصیف (بامعنی و مختصر)
- جذاب و جالب (حاوی هدف اصلی مقاله)
- نه خیلی کوتاه – نه خیلی بلند
- بدون کلمات اضافی
- بررسی عناوین مجله هدف – عنوان کوچک و معلق

Title | **The title of the paper should be concise and definitive**

ساختار مقاله علمی

ASME-JDSMC	Frequency Shifts of Micro and Nano Cantilever Beam Resonators Due to Added Masses
J. Sound & Vib.	Non-planar vibrations of a string in the presence of a boundary obstacle
Micro Nano Lett.	Size-dependent free vibration of nano/microbeams with piezo-layered actuators
J. App. Phys.	Thermal and mechanical response of particulate composite plates under inertial excitation

Title — **The title of the paper should be concise and definitive**

نام نویسندگان و وابستگی آنها

- نام نویسندگان
- دانشگاه یا موسسه (گروه و یا بخش مربوطه)
- آدرس پستی (شهر، استان، کد پستی)
- کشور
- پست الکترونیکی

Author names and affiliations

Recognizing all those who have participated in a paper as co-authors.

ویژگیهای چکیده

کار تبلیغات مقاله	هدف – (Objective)
توصیف کوتاه ، روش نوآورانه	روشها – (Methods)
توصیف کیفی	نتایج – (Results)
نتیجه اصلی (اهمیت پژوهش)	جمع بندی – (Conclusion)

چکیده را در انتهای نگارش مقاله تهیه کنید.

Abstract

To give a clear indication of the objective, method and results

J. Dynamic Systems, Measurement, Control

Frequency Shifts of Micro and Nano Cantilever Beam Resonators Due to Added Masses

- **Objective:**
- We present analytical and numerical … to calculate the shifts in the natural frequencies of electrically actuated micro … for mass detection of biological entities.

- **Methods:**
- … Euler–Bernoulli beams, … the nonlinear electrostatic forces and the added biological cells … discrete point masses.
- … using perturbation techniques and the Galerkin approximation … Numerical techniques …

- **Results:**
- The frequency shifts due to the added masses of … fundamental and higher-order modes of vibrations. Analytical expressions of the natural frequency shifts

- **Conclusion:**
- We found that a hybrid approach … presents the most computationally efficient approach.
- We found that using higher-order modes … or miniaturizing the sizes of the beams .. leads to significant improved frequency shifts, and thus increased sensitivities.

Abstract

To give a clear indication of the objective, method and results

Journal of Sound and Vibration

Non-planar vibrations of a string in the presence of a boundary obstacle

- **Objective:**
- We analyze planar and non-planar motions of a string vibrating against a unilateral curved obstacle.
- Our model incorporates the change in tension due to stretching … and wrapping nonlinearity due to the presence of the obstacle.

- **Methods:**
- The system of equations has been discretized by assuming functional form of the displacements.
- … we perform a stability analysis of the planar motion using Floquet theory.

- **Results:**
- … to investigate the various motions possible both in the absence as well as the presence of the obstacle.
- … the effect of changing obstacle parameters on the critical amplitude
- … obtain the stability boundaries in the space spanned by the obstacle parameters.

- **Conclusions:**
- Beyond the critical amplitude, the planar motion is unstable and we get whirling trajectories.
- We use several modes and observe more complicated non-planar motions due to modal interactions.

Abstract

To give a clear indication of the objective, method and results

JOURNAL OF APPLIED PHYSICS

Thermal and mechanical response of particulate composite plates under inertial excitation

- **Objective:**
- The thermal and mechanical, near-resonant responses of particulate composite plates formed from…and varying volume ratios of ammonium chloride … are investigated.

- **Methods:**
- Each test specimen is clamped and forced with three levels of …
- The mechanical response of each plate is recorded via scanning laser ...
- The plates are excited at resonant frequency and the thermal response is recorded via infrared ...

- **Results:**
- Comparisons are made between the mechanical operational deflection … with correlation seen between …
- The effect of particle/binder ratio on both the thermal and mechanical responses is discussed.

- **Conclusions:**
- The observed thermomechanical effects render an improved understanding of the thermomechanics of plastic-bonded composites, an essential step for vapor-based detection of hidden explosives.

Abstract

To give a clear indication of the objective, method and results

کلید واژه ها

- برخی از مجلات
- بین ۵ تا ۷ کلمه
- جهت جستجوی آنلاین
- استفاده از کلمه های آشنا و کاربردی
- شامل موضوعات کلی و خاص

Keywords | **This is a short list of words relevant to your work.**

ساختار مقاله علمی

ASME-JDSMC	No Keywords.
J. Sound & Vib.	Non-planar vibrations, Stretching nonlinearity, Wrapping nonlinearity, Whirling motion, Oscillating ellipse
Micro Nano Lett.	No Keywords.
J. App. Phys.	No Keywords.

Keywords — **This is a short list of words relevant to your work.**

ساختار مقاله علمی

مقدمه

پاراگراف اول: مسئله تحقیق، ضرورت انجام، اهداف و کاربردهای بنیادی

هدف پاراگراف اول: جذب خواننده و بیان موضوع پژوهش

پاراگرافهای میانی: روند تاریخچه وار موضوعات مختلف مرتبط با مقاله، پررنگ کردن اهمیت کار حاضر

هدف پاراگرافهای میانی: ذکر مواردی که کمتر مورد اهمیت قرار گرفته

پاراگراف انتهایی: هدف اصلی پژوهش، مرور بخشهای مختلف مقاله

هدف پاراگراف انتهایی: ذکر نوآوری پژوهش و سهم آن در گسترش علم مرتبط

Introduction

Outline the problem and why it was worth tackling.

J. Dynamic Systems, Measurement, Control

Frequency Shifts of Micro and Nano Cantilever Beam Resonators Due to Added Masses

- **The Beginning:**
- In recent years, MEMSs sensors have triggered significant interest in utilizing their unique properties to detect with great accuracy physical quantities, such as small gas concentrations, minute biological entities, and very small changes in temperature and pressure [1–8]. Particularly, mass detection of very small biological elements using MEMS devices, such as viruses, bacteria, and cells, has gained increasing attention in recent years [9–13].
- **The Middle:**
- Cantilever beams are essential elements in resonant mass sensors. Several studies investigated the frequency shifts in microcantilever beams. For example, Dohn et al. [19] …
- Increasing the sensitivity of detection through miniaturization also has been an active topic. Hence, considerable research has been conducted on the exploitation of CNTs … [23–25]
- Few studies modeled the dynamics of micro- and nanobeams under electrostatic actuation in the case of an added mass because of … Accurate analytical expressions quantifying the frequency shift in this case have not been developed.
- **The End:**
- We aim to present here an alternative analytical approach based on several perturbation techniques … which combines accuracy and accounts for the electrostatic forces. Specifically, the objective of this paper is to develop accurate … to quantify the frequency shifts of electrostatically MEMS.

Introduction

Outline the problem and why it was worth tackling.

Journal of Sound and Vibration

Non-planar vibrations of a string in the presence of a boundary obstacle

- **The Beginning:**
- We study the various possible motions of a string free to vibrate in two mutually perpendicular planes in the presence of a finite unilateral curved obstacle. This scenario is very relevant to the string vibrations in Indian stringed musical instruments like sitar and veena.
- Strings find application in several fields, e.g., in cranes to lift loads, in musical instruments …
- **The Middle:**
- Non-planar coupled motions of a string and the problem of string vibrating against a unilateral obstacle have been studied from time to time. Initial studies …
- The assumption of constant tension even during vibrations can be justified for small amplitude vibrations in the string. However, this assumption is not always true in practical situations …
- Theoretical studies on the vibration of strings against a rigid obstacle started with the works of Amerio [12] …
- However, all these works on string vibrations against a rigid obstacle assumed planar motions, but in reality ...
- **The End:**
- Hence, a more realistic simulation of the sitar string has to necessarily consider non-planar motions as has been done in the current study. We have included both the stretching and wrapping nonlinearity …
- The rest of the paper is organized as follows. The development of our mathematical model for non-planar motions of a string in the presence of obstacle is presented in Section 2. The derived equations …

Introduction

Outline the problem and why it was worth tackling.

JOURNAL OF APPLIED PHYSICS

Thermal and mechanical response of particulate composite plates under inertial excitation

- **The Beginning:**
- The detection of hidden explosive threats is essential for both national security and defense. While a wide array of detection systems are currently in development or use, the most popular seek to …
- Despite the potential of this approach, the trace vapor detection of composite explosives remains a significant technical challenge due to ...
- Interestingly, the vapor pressures of many explosive materials are greatly affected by temperature [1,3] and may be significantly increased with even slight rises in temperature.

- **The Middle:**
- In many pure materials and alternative composites, heat generation in response to acoustic and ultrasonic excitation is a well-studied effect. Prior investigations have highlighted …
- While mechanically induced heat generation is a well-studied effect in general, few thorough studies of the thermomechanics of particulate composite materials, such as plastic-bonded explosives, to low-frequency excitations currently exist. While the works of Loginov [7]

- **The End:**
- The objectives of this work are to observe and characterize the thermal and mechanical responses of particulate composite plates comprised of hydroxyl-terminated polybutadiene (HTPB) binder and ammonium chloride …

Introduction

Outline the problem and why it was worth tackling.

مدلسازی و روشها

چنانچه از تکنیک جدید و نوآورانه استفاده میکنید، لازم است تمام جزییات را بیان کنید.

تجهیزات، مواد و روش اجرای کار	کار تجربی
فرضیات، ابزار مدلسازی ریاضی و روش حل	کار تئوری و مدلسازی
ورودی ها، ابزار محاسبات و روش اجرا	کار محاسباتی

چنانچه اثبات رابطه خاصی مورد نیاز است بهتر است در پیوست آورده شود.

Materials & Methods

To give enough detail for a competent worker to repeat your work.

J. Dynamic Systems, Measurement, Control

Frequency Shifts of Micro and Nano Cantilever Beam Resonators Due to Added Masses

2 Microbeams

2.1 Problem Formulation. We consider a mass sensor consisting of a microcantilever beam, Fig. 1, of length L actuated by a DC voltage. The equation governing its dynamics can be expressed as

$$\left[\rho bh + \frac{m}{L}\delta(\hat{x}-\hat{l})\right]\frac{\partial^2 \hat{w}}{\partial \hat{t}^2} + \mathrm{EI}\frac{\partial^4 \hat{w}}{\partial \hat{x}^4} = \hat{F}_b \quad (1)$$

$$\hat{F}_B = \frac{1}{2}\varepsilon b \frac{V_{DC}^2}{(d-\hat{w})^2} \quad (2)$$

... is the position along the microbeam, ρ is the ma- ... the moment of inertia of the cross section, h is ... ckness, m is the added point mass at $\hat{x}=\hat{l}$, E is ... d is the capacitor gap width, and ε is the ... of the medium. Equation (2) represents the ... ectric force when neglecting the fringing effect of the electric field. The corresponding boundary conditions are

$$\hat{w}=0 \text{ and } \hat{w}'=0 \text{ at } \hat{x}=0 \quad (3)$$

$$\hat{w}''=0 \text{ and } \hat{w}'''=0 \text{ at } \hat{x}=L \quad (4)$$

$$(1-w)^2[1+\alpha_1\delta(x-l)]\frac{\partial^2 w}{\partial t^2} + (1-w)^2\frac{\partial^4 w}{\partial x^4} = \alpha_2 V_{DC}^2 \quad (11)$$

We seek an approximate solution of Eq. (11) using the Galerkin approximation in the form

$$w(x,t) = \sum_n^N u_n(t)\phi_n(x) \quad (12)$$

where the $\phi_n(x)$ are the eigenfunctions of a cantilever beam in the absence of the electrostatic load. Thus,

$$\phi_n(x) = \kappa_n\left[\cos h(z_n x) - \cos(z_n x) + \frac{\cos(z_n)+\cos h(z_n)}{\sin(z_n)+\sin h(z_n)}\left[(\sin(z_n x) - \sin h(z_n x))\right]\right] \quad (13)$$

where the z_n are the roots of

$$\cos(z)\cosh(z) + 1 = 0 \quad (14)$$

Table 1 The geometric properties of the studied microbeam

Symbol	Quantity	Dimensions
L	Length	500 (μm)
h	Thickness	3 (μm)
b	Width	50 (μm)
d	Gap	3 (μm)
E	Young's modulus	166 (GPa)
ρ	Density	1400 (kg/m^{-3})

Materials & Methods

To give enough detail for a competent worker to repeat your work.

Journal of Sound and Vibration

Non-planar vibrations of a string in the presence of a boundary obstacle

2. Mathematical model

A schematic representation of the physical system under consideration is shown in Fig. 2. It comprises an ideal string (with no bending stiffness and internal damping) which can vibrate along the y- and z-axis with the y motions restricted by the smooth obstacle at one of the ends. The string starts from O which is the origin of our system and it is tied to the support at the other end which is at a distance of L. We assume the sliding along the obstacle to be frictionless and smooth

We further make the following two assumptions related to the motion of the string over the bridge:

1. The string perfectly wraps around the bridge while vibrating, i.e., there is a single continuous wrapped portion and a unique separation point at $x = \Gamma$.
2. The string remains tangent to the bridge at the point of separation, i.e., at $x = \Gamma$.

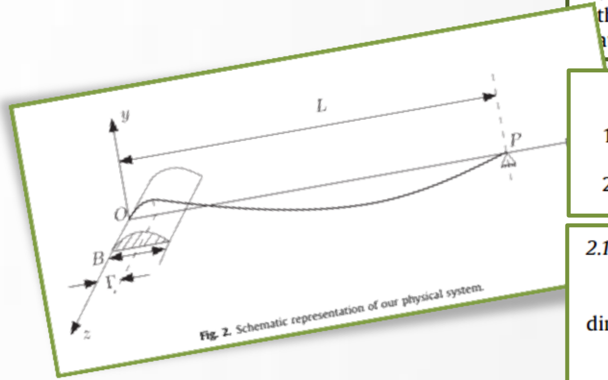


Fig. 2. Schematic representation of our physical system.

2.1. Non-dimensional parameters

In order to avoid errors during numerical simulations, it would be judicious to express the governing equations in non-dimensional form. The non-dimensional variables are defined as follows

$$\bar{x} = \frac{x}{L}, \quad \bar{y}(\bar{x}, \tau) = \frac{y(x,t)}{h}, \quad \gamma = \frac{\Gamma(t)}{L}, \quad b = \frac{B}{L}, \quad a = A_p\frac{L^2}{h}, \quad \tau = t\sqrt{\frac{T}{\rho L^2}}, \quad \sigma = \frac{EAh^2}{2L^2T_0}, \tag{29}$$

2.2. Galerkin Projection

For fully understanding the dynamics of the string, we need to find solutions of the coupled nonlinear partial differential equations (PDEs) (31) and (32). However, exact analytical solutions to these coupled PDEs do not exist. Therefore, we use the

Materials & Methods

To give enough detail for a competent worker to repeat your work.

ساختار مقاله علمی

JOURNAL OF APPLIED PHYSICS

Thermal and mechanical response of particulate composite plates under inertial excitation

II. EXPERIMENTA...

A...

cha... e thermome-
pris... aterial com-
com... HT...
ticle... NH_4...
of an... artic...
volun... teria...
real-w... ficar...
mecha... ges c...
importa... erial...
To... eated...
60 °C an... A w...
ting agen... on a...
mixing o... volun...
ratio, a R... sure...
homogene... ...re was then
poured int... ...e mold, and each was cured

FIG. 1. The experimental setup. Here, a FLIR A325 infrared camera is positioned above a 50% particle/binder ratio plate mounted to the TIRA shaker by the CFCF clamping mount.

B. Experimental setup

To provide mechanical excitation ... RA 59335/LS AIT-440 ... ed, which ... ta- ... a- ... a ... e

TABLE I. Plate material properties.

Volume fraction-sample	Mass (kg)	Density (kg/m^3)	Approximate age (Days)
50%-1	0.6656	1154	450
50%-2	0.6593	1149	360
65%-1	0.8189	1297	450
65%-2	0.7162	1196	360
75%-1	0.6460	1086	450
75%-2	0.6354	1118	280
75%-3	0.5940	1031	280

...alysis, broadband ...was applied at three distinct forcing ...(1.3, 1.9, and 2.4 g RMS). Operational deflection shapes were recorded at direct, 6 g forcing and were not seen to qualitatively change with excitation level. The system response

Materials & Methods

To give enough detail for a competent worker to repeat your work.

نتایج و بحث در نتایج

- اعتبار سنجی و نشان دادن صحت نتایج
- بیان نتایج سودمند جهت پاسخ دهی به نقصان های مطرح شده در مقدمه
- تا حد ممکن نکات اصلی و کاربردی مستخرج از نتایج را بیان کنیم، رها نکردن خواننده
- در مورد اهمیت نتایج خود بحث کنید. خواننده ترغیب شود نتایج شما را در کار خود نقل کند.
- انتخاب مناسب عنوان ها و زیرنویس های شکل ها و جداول، بی نیاز از توصیف
- در پاراگراف انتهایی جمع بندی کنید و اهم نتایج خود را بیان نمایید.

Results & Discussion

Here the researcher presents summarized data interprets them.

J. Dynamic Systems, Measurement, Control

Frequency Shifts of Micro and Nano Cantilever Beam Resonators Due to Added Masses

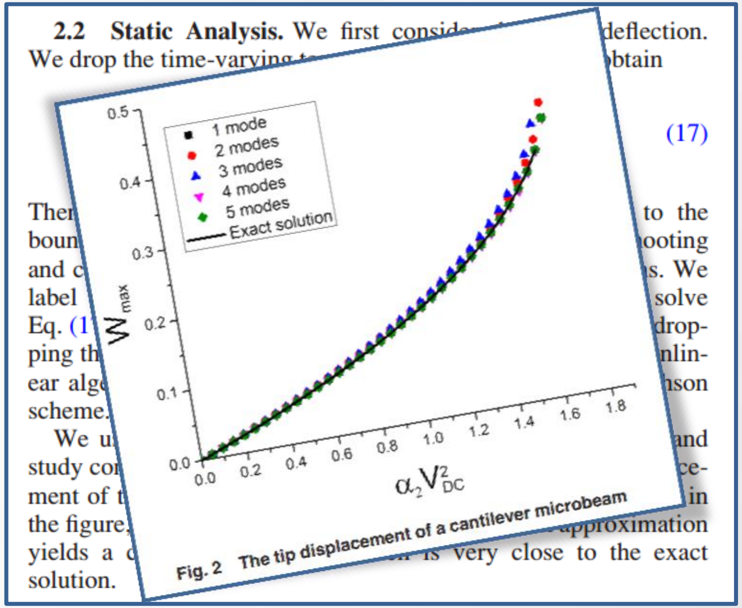


Fig. 2 The tip displacement of a cantilever microbeam

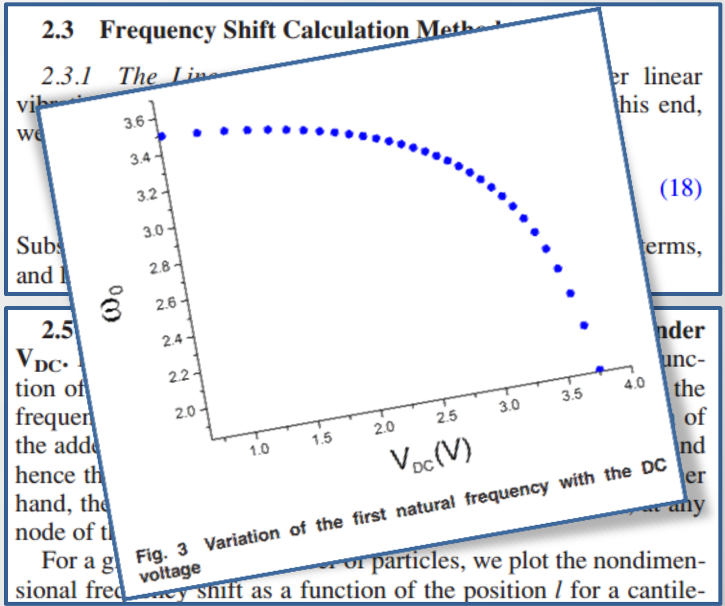


Fig. 3 Variation of the first natural frequency with the DC voltage

Results & Discussion

Here the researcher presents summarized data interprets them.

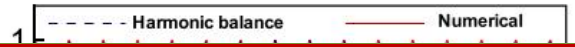
ساختار مقاله علمی

Journal of Sound and Vibration

Non-planar vibrations of a string in the presence of a boundary obstacle

4. Dynamics of the string in the presence of obstacle

In this section we study the effect of the obstacle on the dynamics of the string. Similar to Section 2 we will only restrict



We finally look at the trajectory of a point which gets into intermittent contact with the obstacle surface to explore the string's motion further. We have chosen a point at the mid-point of the obstacle, i.e., $x = b/2 = 0.025$ for this purpose. The trajectory of the string at $x=0.025$ for a single and three mode approximation for the non-whirling and whirling motions is shown in Fig. 18. Comparing the trajectories for the single-mode in Figs. 18A and C with the corresponding ones in Figs. 7 and 8, we can see that these trajectories are just a scaled and truncated version of the trajectories for the free portion. The scaling down happens because of the closeness to the point of separation and the truncation in y-motion is because of wrapping around the obstacle. However, a comparison of Figs. 18B and D with the corresponding figures in Fig Fig 17 reveals that these trajectories are more complex. To explain this, we note that there is an almost equal contribution from all the three modes to the y and z displacements of the string at $x=0.025$ whereas these displacements at $x=0.5$ are largely dominated by the first and the third mode. The extra complexity of the trajectory for the unwrapped portion at $x=0.025$ can, therefore, be attributed to the contribution of the second mode.

Fig. 10. Comparison between numerical and approximate (single-term harmonic balance) solution for $b=0.05$, $a=1600$, $\sigma = 0.001$ and initial condition as $\beta(0) = 1$, $\dot{\beta}(0) = 0$, $\alpha(0) = 0$ and $\dot{\alpha}(0) = 0$.

Fig. 8. Top: Trajectory of the mid-point of the string, bottom: variation in β. Figures A and C correspond to the initial condition $\alpha(0) = 1$, $\dot{\alpha}(0) = 0$, $\beta(0) = 4$ and $\dot{\beta}(0) = 0$, while figures B and D correspond to $\alpha(0) = 0$, $\dot{\alpha}(0) = 1$, $\beta(0) = 4$ and $\dot{\beta}(0) = 0$. The parameters are $b=0.05$, $a=1600$ and $\sigma = 0.001$.

Results & Discussion

Here the researcher presents summarized data interprets them.

JOURNAL OF APPLIED PHYSICS

Thermal and mechanical response of particulate composite plates under inertial excitation

III. RESULTS

A. Mechanical response

The vibrometer-recorded H1 frequency response estimators for a representative plate in response to three levels of

B. Thermal response

The average of three transient surface temperature responses of each plate at the first resonance, presented separately as the spatial average and maximum surface temperatures of the plate, are presented in Figure 5. As visible in the

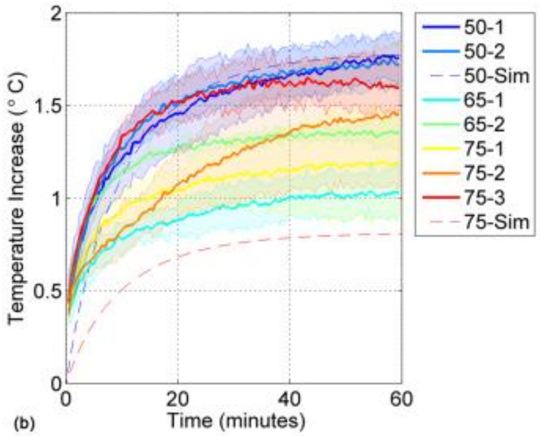


FIG. 5. Comparison of the experimentally obtained plate surface temperatures vs. time in response to a 2 g excitation near the first resonant frequency for all plates. Solid lines indicate experimental data, each the average of three distinct trials per plate. The colored envelope indicates one standard deviation for each trial. Dotted lines indicate numerical simulation data. Data are presented for (a) mean and (b) maximum plate surface temperatures vs. time.

Results & Discussion

Here the researcher presents summarized data interprets them.

JOURNAL OF APPLIED PHYSICS

Thermal and mechanical response of particulate composite plates under inertial excitation

IV. DISCUSSION

A. Viscoelastic heating model

As a point of comparison to the experimental mechanical responses, an analytical solution to the experimentally realized, clamped-free-clamped-free (CFCF) plate vibration problem was approximated through the superposition of clamped-clamped and free-free beam functions as in Warburton.[21] While interaction between the clamped and

The peak frequency response values corresponding to various analytical modes are presented in Table II. As evident in the table, the nondimensionalized frequency response peaks of the analytical models seem to provide a decent analog to the experimental data. In addition, the frequency responses of the analytical models are presented in Figures 2 and 4. As evident in the figures, the viscoelastic model appears to provide a good qualitative match for the experimental data, accurately reproducing most of the behaviors

The steady-state temperature profile predicted for the 50% case is presented in Figure 6. The prediction echoes the experimental data with three bands of temperature concentration but appears to be more highly concentrated at the clamped edges. This discrepancy may be due to the imperfect experimental clamps, which allow for some rotation, and the insulated boundary assumptions, which would not accurately account for conduction into the experimental clamping fixture. The 75% thermal profile is not presented due to its qualitative similarities to the 50% result, which is different only in scale as obvious in the transient temperature data presented in Figure 5.

Results & Discussion

Here the researcher presents summarized data interprets them.

ساختار مقاله علمی

جمع بندی و نتیجه گیری

یافته های مهم پژوهش و اهمیت آنها را خلاصه وار بیان نمایید.

بر اساس موارد مطرح شده در بخش نتایج	نتیجه های مطرح شده
پیشنهادات جهت ادامه کار، محدودیتها	ادامه کار
نتایج اساسی پژوهش و کابردهای مشخص آن	کاربرد

دقت کنید که موارد مطرح شده در چکیده و نتیجه گیری یکسان نباشد.

Conclusions

To present your main conclusions and their significance.

J. Dynamic Systems, Measurement, Control

Frequency Shifts of Micro and Nano Cantilever Beam Resonators Due to Added Masses

4 Conclusions

The shifts in the frequencies of a cantilever beam due to an added point mass demonstrate great potential for biological and chemical applications. Taking advantage of the electrostatic actuation, which is considered as a simple and effective method for actuation of MEMS and CNTs, analytical expressions for the frequency shifts as a function of the added mass and its position using Galerkin approximation and perturbation techniques have

It is worth to mention that all the conducted derivations of this work have been based on the assumption that the size of the added particle/mass is too small compared to the length of the beam, which may justify a point-mass assumption. Otherwise, the mass distribution should be modeled using a Heaviside function.

Conclusions

To present your main conclusions and their significance.

Journal of Sound and Vibration

Non-planar vibrations of a string in the presence of a boundary obstacle

6. Conclusion

We have analyzed the various possible motions for a string in the presence of a curved unilateral boundary obstacle including the stretching and the wrapping nonlinearity. We have considered an obstacle which has curvature only along the length of the string. We find that the presence of the obstacle and the stretching nonlinearity leads to a unique planar motion which is perpendicular to the obstacle surface as opposed to infinitely many planar motions possible in its absence. The obstacle, further, has a stabilizing effect on the planar motions as it results in instability for a finite amplitude of vibration contrary to an unstable planar motion with arbitrarily small amplitudes without the obstacle. Hence, the possible motions for a string in the presence of the obstacle are planar motions perpendicular to the obstacle surface and either 'oscillating ellipses' (non-whirling motions) or 'precessing ellipses' (whirling motions) depending on the magnitude

It is evident from our analysis that the assumption of planar motion does not capture the holistic dynamics of the string in the presence of the obstacle. Moreover, in almost all practical scenarios, the motion of the string is undoubtedly non-planar and the amplitude of motion is large enough to include the nonlinear effects due to stretching. Thus, our model is very relevant to such cases and it aptly captures the dynamics of the 3-dimensional motions of a string vibrating in the presence of an obstacle. Our analysis shows that even pure lateral perturbation parallel to the obstacle surface gives rise to transverse vibrations perpendicular to the surface. This is quite pertinent to an Indian stringed musical instrument, known as *sitar*, which is usually played by plucking/striking in the lateral direction but the string exhibits significant transverse motions. However, the vibrations perpendicular to the bridge surface in our model are not as large as observed

Conclusions

To present your main conclusions and their significance.

تشکر و قدردانی

تشکر از افراد خاصی که سهم ویژه و مشخصی در مقاله داشته اند.

قدردانی از موسسه یا سازمان خاصی که ممکن است حمایت مادی و معنوی داشته باشد.

Acknowledgments

To acknowledge individuals or institutions with great contribution.

References

ASME Style

- Within the text, references should be cited in numerical order according to their order of appearance. The numbered reference citation within text should be enclosed in brackets.
- **Website Content**
- [5] “Wind Power Guide,” Wikipedia, last modified July 18, 2008, http://en.wikipedia.org/wiki/Wind_Power_guide.
- **Journal Articles and Papers in Serial Publications**
- [9] Zhang, T. W., Khun, C., Liu, Q., and Miller, A. P., 2011, “Self-Healing Techniques,” Nature, 332(6662), pp. 888-892.
- **Chapter Within a Book**
- [32] Stevens, T. T., 1999, “Stochastic Fields and Their Digital Simulation,” Stochastic Methods. T. A. Sulle, and M. Siiu, eds., Martinius Publishers, Dordrecht, Germany, pp. 22-36.
- **Individual Conference Papers**
- [21] Wions, T. T., and Mills, C. D., 2006, “Structural Dynamics in Parallel Manipulation,” Proceedings of the IDETC/CIE, New Orleans, LA, September 10-13, 2005, ASME Paper No. DETC2005-99532, pp. 777-798.
- **Theses and Technical Reports**
- [1] Oligaria, T. T., Fredy, C. W., Popullo, A. Z., and Tucker, M. A., 20111, “Characterization of PKM Dynamics,” SAE Technical Paper No. 2011-02-8345, 07ATC-96.

References | **To cite significant previous works.**

مطالب مورد بحث

- چرا پژوهش؟
- ساختار مقاله علمی
- داوری همتا
- تعارض منافع
- اعتبار مجلات
- شاخص هرش
- دسترسی به پایگاه های استنادی

داوری همتا

قضاوت دقیق یک تحقیق علمی – افزایش اعتبار و تقویت محتوای مقاله

افزایش دقت داوری – افزایش کیفیت علمی مقالات

داوری دو سو کور – (anonymous or blind peer review)

داوری یک سو کور – (open peer review)

Peer Review

Peer review confirms the validity of the science reported.

مطالب مورد بحث

- چرا پژوهش؟
- ساختار مقاله علمی
- داوری همتا
- تعارض منافع
- اعتبار مجلات
- شاخص هرش
- دسترسی به پایگاه های استنادی

تعارض منافع

Full transparency is always the best course of action.

مطالب مورد بحث

- چرا پژوهش؟
- ساختار مقاله علمی
- داوری همتا
- تعارض منافع
- اعتبار مجلات
- شاخص هرش
- دسترسی به پایگاه های استنادی

اعتبار مجلات

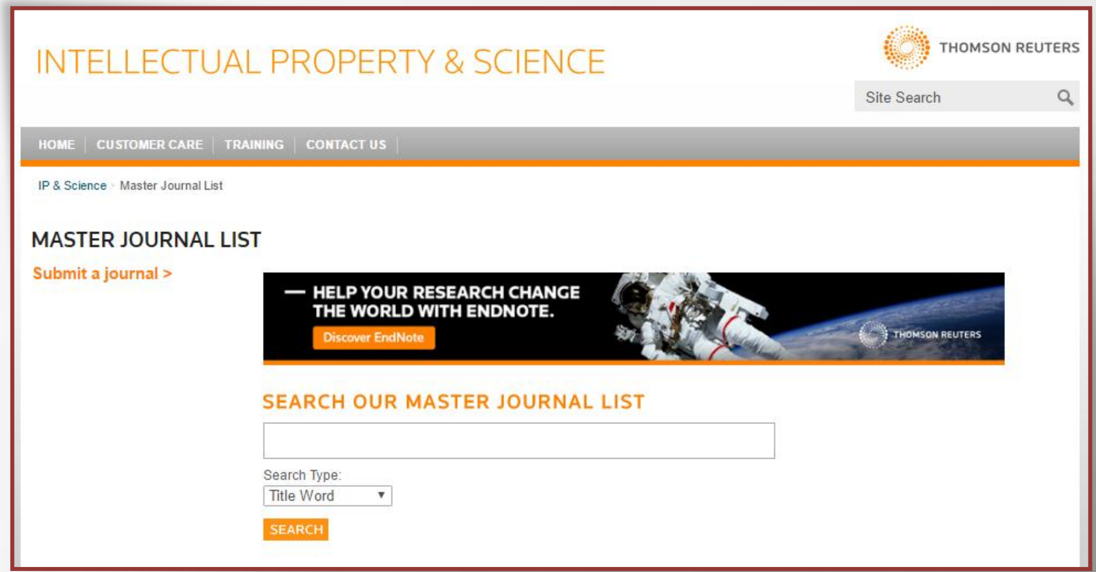
http://ip-science.thomsonreuters.com/mjl/

Thomson Reuters

Scopus

ISC

PubMed



ضریب تاثیر سال ۲۰۰۹ = فراوانی استنادها در سال ۲۰۰۹ به مقالات منتشر شده در ۲۰۰۸ و ۲۰۰۷ / مجموع مقالات قابل استناد منتشر شده در ۲۰۰۸و۲۰۰۷

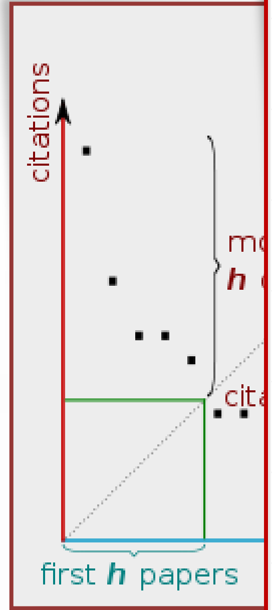
Thomson Reuters

The Master Journal List includes all journal titles covered in WOS.

مطالب مورد بحث

- چرا پژوهش؟
- ساختار مقاله علمی
- داوری همتا
- تعارض منافع
- اعتبار مجلات
- شاخص هرش
- دسترسی به پایگاه های استنادی

شاخص هرش



Scopus Preview

	Title	Type	↓ SJR	H index	Total Docs. (2015)	Total Docs. (3years)	Total Refs.	Total Cites (3years)	Citable Docs. (3years)	Cites / Doc. (2years)	Ref. / Doc.
1	Nature Materials	journal	21.395 Q1	313	295	734	8268	18358	536	32.28	28.03
2	Advanced Materials	journal	9.021 Q1	345	1321	2860	47342	50417	2696	18.37	35.84
3	Nano Letters	journal	9.006 Q1	341	1273	3234	52480	47024	3174	14.18	41.23
4	Materials Science and Engineering: R: Reports	journal	7.616 Q1	107	13	30	4360	702	30	25.83	335.38
5	Materials Today	journal	6.876 Q1	98	106	235	4540	2298	134	16.33	42.83
6	International Journal of Plasticity	journal	4.694 Q1	98	115	389	6698	2184	371	5.36	58.24
7	2D Materials	journal	4.344 Q1	8	128	36	5890	210	36	5.83	46.02

h-index (Hirsch-index)

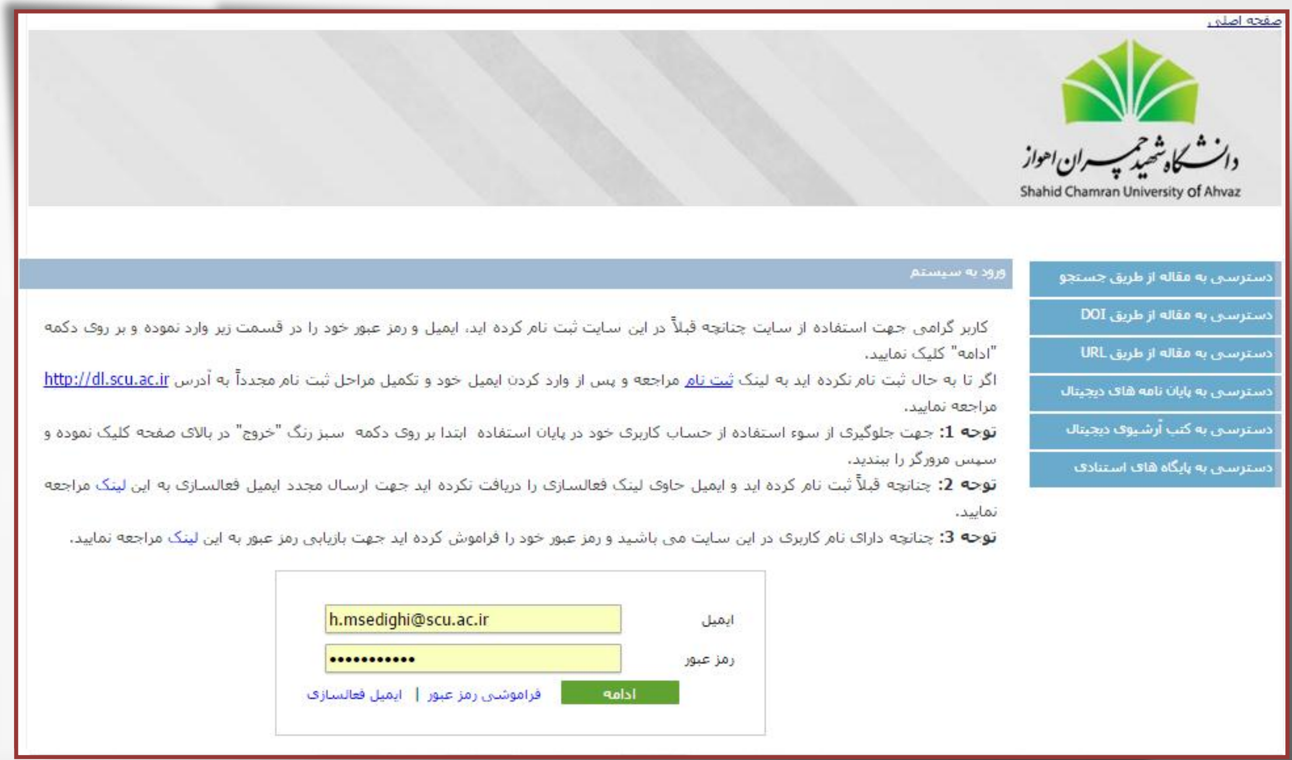
The h-index is an author-level metric.

مطالب مورد بحث

- چرا پژوهش؟
- ساختار مقاله علمی
- داوری همتا
- تعارض منافع
- اعتبار مجلات
- شاخص هرش
- دسترسی به پایگاه های استنادی

دسترسی به پایگاه های استنادی

http://scu.ac.ir/



با سپاس از توجه شما