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Erratum

Erratum to "Parametric resonance of a rotating cylindrical shell subjected to periodic axial loads" [Journal of Sound and Vibration 214 (1998) 513–529]

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This note is in reference to an earlier work, Ng et al. [1], whose principal author is the present writer, and serves two purposes:

(1) First and foremost, it is to rectify some inaccurate results presented in Ref. [1] due to an unfortunate minor coding error in the numerical code involving the forcing frequency parameter P, by presenting a corresponding new set of accurate results. These new results will also be qualitatively discussed.
(2) Secondly the opportunity is taken here to amend a typographical misprint in one of the equations presented in Ref. [1].

1. New numerical results

In Ref. [1], the numerical results shown in Tables 1–4, of that paper, were correspondingly plotted in Figs. 3–18. In this note, due to space limitation, the new set of correct results corresponding to the cases of Tables 1–4 in Ref. [1] are presented only in tabulated form, and will not be plotted.

In these present results shown in Tables 1–4 here, it is obvious that contrary to that which was observed in Ref. [1], the shell rotation does not cause the generation of two unstable regions, for each mode. This therefore renders paragraphs 6–9 of the "Numerical Results and Discussion" section in Ref. [1] invalid. However, the observation of the boundaries of each unstable region shifting horizontally away from each other upon rotation, which was observed in Ref. [l], tallies with the present observations.

From the present results, we can conclude that the Coriolis effects do not lead to the generation of two unstable regions, for each mode, in the real plane. The Coriolis effects cause the boundaries

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Table 1
Unstable regions for the transverse modes of a simply supported isotropic rotating cylindrical shell of $v=0.3$ and geometric properties $L/R=2$ and $R/H=100$ and subjected to extensional loading of $\eta_0=0.1\ \eta_{cr}$

$\bar{\Omega}$	p_1	p_2	$\Theta(\times 10^{-3})$
Mode (1,1)			
0	1.147510143	1.147510143	1.181011
$0.1\varpi_{0,(1,1)}$	1.147421731	1.147598493	0.980984
$0.2\varpi_{0,(1,1)}$	1.147333371	1.147686911	0.819464
Mode (1,2)			
0	0.661285931	0.661285931	2.049864
$0.1\varpi_{0,(1,2)}$	0.661241071	0.661330968	1.941637
$0.2\varpi_{0,(1,2)}$	0.661203037	0.661371972	1.843994
Mode (1,3)			
0	0.404794834	0.404794834	3.349733
$0.1\varpi_{0,(1,3)}$	0.404774958	0.404814611	3.306232
$0.2\varpi_{0,(1,3)}$	0.404755166	0.404834476	3.257703
Mode (1,4)			
0	0.286536716	0.286536716	4.734211
$0.1\varpi_{0,(1,4)}$	0.286525590	0.286547877	4.706314
$0.2\varpi_{0,(1,4)}$	0.286514464	0.286559039	4.678707

Table 2
Unstable regions for the transverse modes of a simply supported isotropic rotating cylindrical shell of $v=0.3$ and geometric properties $L/R=2$ and $R/H=100$ and subjected to compressive loading of $\eta_0=-0.1\ \eta_{cr}$

$\bar{\Omega}$	p_1	p_2	$\Theta(\times 10^{-3})$
Mode (1,1)			
0	1.142776005	1.142776005	1.186329
$0.1\varpi_{0,(1,1)}$	1.142687959	1.142864039	0.986486
$0.2\varpi_{0,(1,1)}$	1.142599903	1.142952053	0.825193
Mode (1,2)			
0	0.653034441	0.653034441	2.077394
$0.1\varpi_{0,(1,2)}$	0.652993496	0.653075391	1.977545
$0.2\varpi_{0,(1,2)}$	0.652952541	0.653116329	1.882734
Mode (1,3)			
0	0.391165368	0.391165368	3.473003
$0.1\varpi_{0,(1,3)}$	0.391146213	0.391184531	3.425658
$0.2\varpi_{0,(1,3)}$	0.391127076	0.391203710	3.378731
Mode (1,4)			
0	0.266927704	0.266927704	5.102492
$0.1\varpi_{0,(1,4)}$	0.266917338	0.266938101	5.076625
$0.2\varpi_{0,(1,4)}$	0.266906997	0.266948523	5.050886

Table 3
Unstable regions for the transverse modes of a simply supported isotropic rotating cylindrical shell of $v = 0.3$ and geometric properties $L/R = 2$ and $R/H = 100$ and subjected to extensional loading of $\eta_0 = 0.2\ \eta_{cr}$

$\bar{\Omega}$	p_1	p_2	$\Theta(\times 10^{-3})$
Mode (1,1)			
0	1.149869661	1.149869661	2.357024
$0.1\varpi_{0,(1,1)}$	1.149781109	1.149958277	2.147079
$0.2\varpi_{0,(1,1)}$	1.149692491	1.150046828	1.956532
Mode (1,2)			
0	0.665372888	0.665372888	4.074289
$0.1\varpi_{0,(1,2)}$	0.665331190	0.665414637	3.976419
$0.2\varpi_{0,(1,2)}$	0.665289466	0.665456352	3.876344
Mode (1,3)			
0	0.411439402	0.411439402	6.590848
$0.1\varpi_{0,(1,3)}$	0.411419248	0.411459555	6.541257
$0.2\varpi_{0,(1,3)}$	0.411399132	0.411479739	6.490882
Mode (1,4)			
0	0.295852732	0.295852732	9.169040
$0.1\varpi_{0,(1,4)}$	0.295841236	0.295864249	9.140877
$0.2\varpi_{0,(1,4)}$	0.295829786	0.295875810	9.112268

Table 4
Unstable regions for the transverse modes of a simply supported isotropic rotating cylindrical shell of $v = 0.3$ and geometric properties $L/R = 2$ and $R/H = 100$ and subjected to compressive loading of $\eta_0 = -0.2\eta_{cr}$

$\bar{\Omega}$	p_1	p_2	$\Theta(\times 10^{-3})$
Mode (1,1)			
0	1.140401294	1.140401294	2.378315
$0.1\varpi_{0,(1,1)}$	1.140313465	1.140489176	2.168811
$0.2\varpi_{0,(1,1)}$	1.140225612	1.140577031	1.979382
Mode (1,2)			
0	0.648868879	0.648868879	4.184567
$0.1\varpi_{0,(1,2)}$	0.648828206	0.648909577	4.084123
$0.2\varpi_{0,(1,2)}$	0.648787533	0.648950279	3.986121
Mode (1,3)			
0	0.384168422	0.384168422	7.074257
$0.1\varpi_{0,(1,3)}$	0.384149608	0.384187240	7.014284
$0.2\varpi_{0,(1,3)}$	0.384130813	0.384206074	6.967822
Mode (1,4)			
0	0.256559852	0.256559852	10.667037
$0.1\varpi_{0,(1,4)}$	0.256549877	0.256569833	10.554579
$0.2\varpi_{0,(1,4)}$	0.256539937	0.256579849	10.442165

of each unstable region to horizontally shift away from each other resulting in larger regions of instability, when the rotational speed increases.

2. Corrigenda

Here we amend the equation misprint. The correct form of Eq. (25) in Ref. [1] should read as

$$\det\left[\begin{pmatrix} \mathbf{K}^* - \frac{1}{2}\mathbf{Q}^* - \frac{1}{4}P^2\mathbf{M}^* & -\frac{1}{2}P\mathbf{G}^* \\ \frac{1}{2}P\mathbf{G}^* & \mathbf{K}^* + \frac{1}{2}\mathbf{Q}^* - \frac{1}{4}P^2\mathbf{M}^* \end{pmatrix}\right] = 0.$$

References

[1] T.Y. Ng, K.Y. Lam, J.N. Reddy, Parametric resonance of a rotating cylindrical shell subjected to periodic axial loads, Journal of Sound and Vibration 214 (3) (1998) 513–529.