

UNIVERSITI SAINS MALAYSIA

Peperiksaan Kursus Semasa Cuti Panjang

Sidang Akademik 2002/2003

2002/2003 Academic Session

April 2003

April 2003

ESA 202/3 – Simulasi Dan Pemodelan Sistem Dinamik

(Simulation and Dynamic System Modeling)

Masa : [3 Jam]

Time : [3 hours]

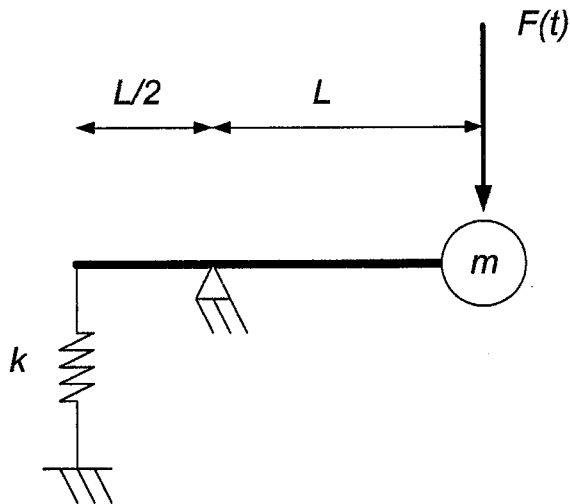
ARAHAN KEPADA CALON :

INSTRUCTION TO CANDIDATES:

1. Sila pastikan bahawa kertas peperiksaan ini mengandungi **(8) LAPAN** mukasurat bercetak **termasuk lampiran** dan **(6) ENAM** soalan.
*Please ensure that this paper contains **(8) EIGHT** printed pages including attachments and **(6) SIX** questions.*
2. Anda dikehendaki menjawab **(4) EMPAT** soalan
*Please answer **(4) FOUR** questions .*
3. Agihan markah bagi setiap soalan diberikan di sut sebelah kanan.
The marks allocated for each questions is shown on the right hand side.
4. Soalan boleh dijawab dalam Bahasa Inggeris kecuali satu soalan wajib dijawab dalam Bahasa Melayu.
The questions can be answered in English but one questions must be answered in Bahasa Melayu.
5. Mesin kira bukan yang boleh diprogram boleh digunakan.
Non programmable calculator can be used.

...2/

1.



Rajah 1/Figure 1

Pertimbangkan sistem tuil mekanikal seperti diterangkan dalam Rajah 1. Berdasarkan kepada gambarajah jasad bebas, tentukan:

Consider a leverage mechanical system as explained in Figure 1. Based on free body diagram, determine:

- (a) Persamaan pergerakan

The equation of motion.

- (b) Frekuensi tabii sistem ini.

Natural frequency of the system.

(25 markah/marks)

3. Pertimbangkan masalah 1.

Consider problem 1.

- (a) Jika masukan $F(t)$ ialah ujaan harmonik beramplitud F_0 dan berfrekuensi ω , tentukan sambutan sistem ini.

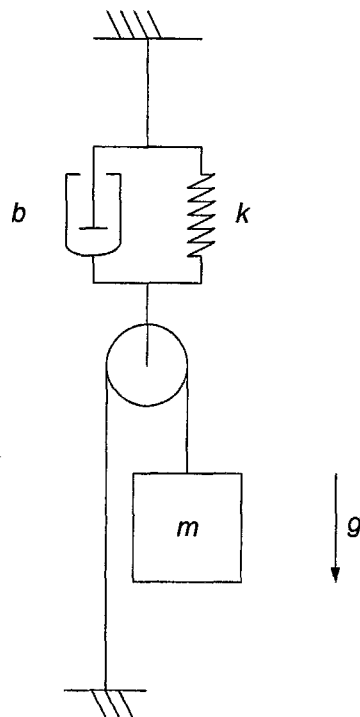
If the input $F(t)$ is a harmonic excitation with amplitude of F_0 and frequency of ω , determine the response of the system.

- (b) Jika masukan ialah dedenyut bermagnitud 1 Nsec, tentukan sambutan sistem ini.

If the input is an impulse with magnitude of 1 Nsec., determine the response of the system.

(25 markah/marks)

4.



Rajah 2/Figure 2

Pertimbangkan mekanisma kapi seperti diterangkan dalam Rajah 2.

Kapi diandaikan sebagai tanpa jisim dan tanpa geseran, tali dianggap tidak boleh memanjang. Graviti ialah g .

Consider a pulley mechanism as explained in Figure 2.

The pulley is assumed massless and frictionless, the string is considered un-extendable. The gravity is g .

Berdasarkan kepada gambarajah jasad bebas, tentukan:

Based on free body diagram, determine:

- (a) Persamaan pergerakan

The equation of motion.

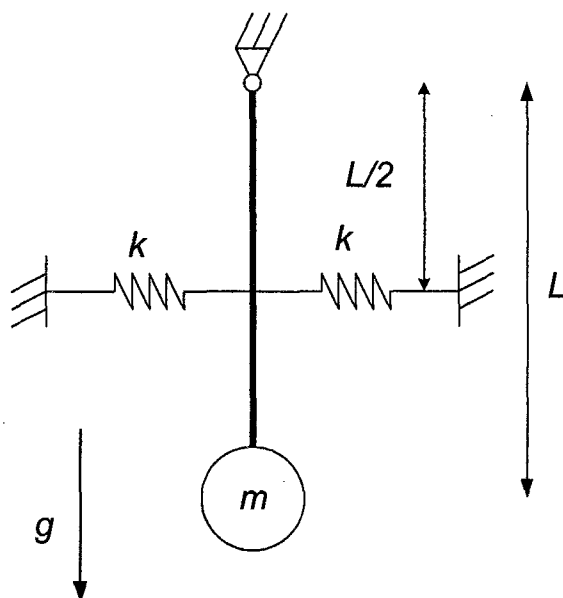
- (b) Frekuensi tabii sistem ini

Natural frequency of the system.

(25 markah/marks)

...6/

6.



Rajah 3/Figure 3

Pertimbangkan bandul seperti diterangkan dalam Rajah 3.
Graviti ialah g .

*Consider a pendulum as explained in Figure 3.
The gravity is g .*

Berdasarkan kepada gambarajah jasad bebas, tentukan:

Based on free body diagram, determine:

- (a) Persamaan pergerakan

The equation of motion.

- (b) Frekuensi tabii sistem ini

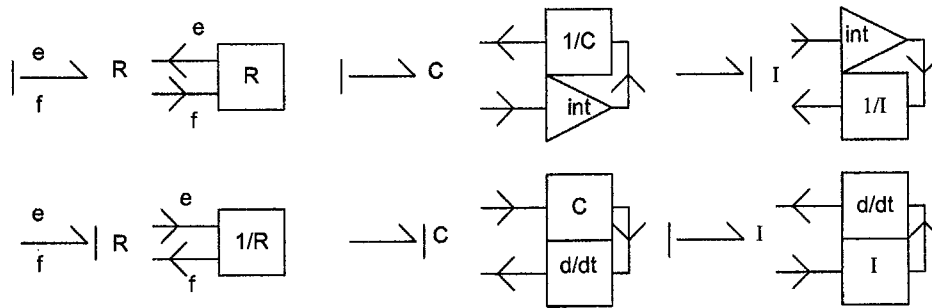
The natural frequency of the system.

(25 markah/marks)

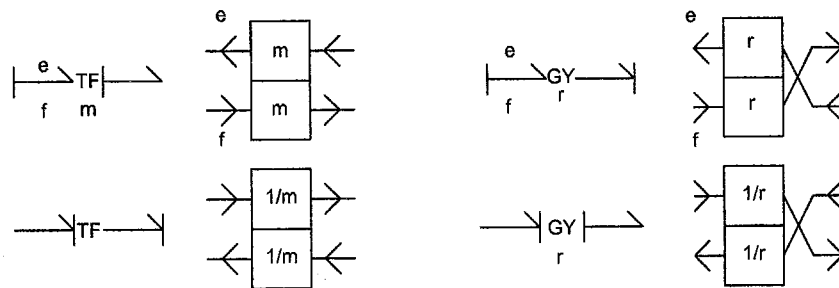
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Lampiran
Attachment

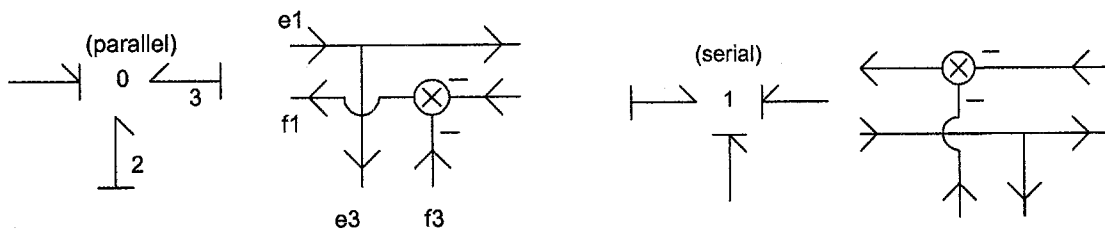
Komponen 1-liang:
1-Port Components:



Komponen 2-liang:
2-Port Components:



Komponen berbilang-liang:
Multi-Port Components:



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