

Semaine 4

QCMs

ME-332 – Mécanique Vibratoire

EPFL

Plan du cours

Mécanique Vibratoire - SGM Ba5 - G. Villanueva

Week	Jours	Partie du cours	Exercices	Homework
1	09.09//11.09	Intro et oscillateur 1D libre conservatif	Série 1	Leçon 1.1&1.2
2	18.09	Oscillateur 1D libre dissipatif	Série 2	Leçon 2.1&2.2
3	23.09//25.09	Régime permanent harmonique (complexe)	Série 3	Leçon 3.1&3.2
4	30.09//02.10	Régime permanent périodique (série de Fourier)	Série 4	Leçon 4.1&4.2
5	07.10//09.10	Régime forcé général (transf. Laplace ou Fourier)	Série 5	Leçon 5.1&5.2
6	14.10//16.10	Systèmes à 2 DDL conservatifs	Série 6	Leçon 6.1&6.2
BREAK!!!				
7	28.10//30.10	Récapitulatif // séance de QCMs	MIDTERM	
8	04.11//06.11	Systèmes à 2DDL dissipatifs, osc. de Frahm	Série 7	Leçon 7.1&7.2
9	11.11//13.11	Systèmes à n DDL, conservatif	Série 8a	Leçon 8.1&8.2
10	18.11//20.11	Systèmes à n DDL, conservatif	Série 8b	
11	25.11//27.11	Systèmes à n DDL, dissipatif	Série 9	Leçon 9.1&9.2
12	02.12//04.12	Systèmes à n DDL, forcé	Série 10	Leçon 10.1&10.2
13	09.12//11.12	Systèmes continus: barres & poutres	Série 11	Leçon 11.1&11.2
14	16.12//18.12	Récapitulatif // séance de QCMs		

EPFL Before we start... let's connect!

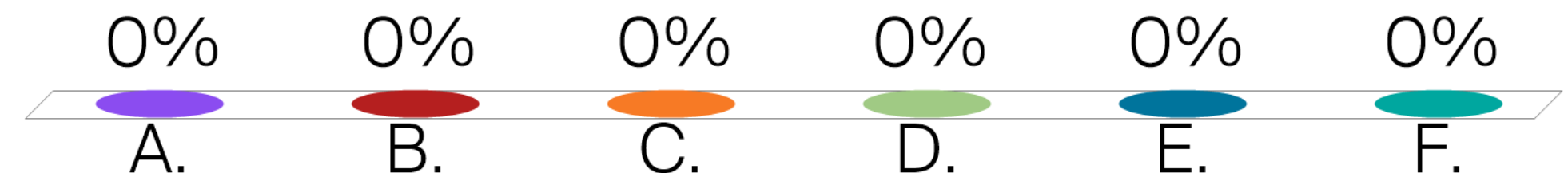
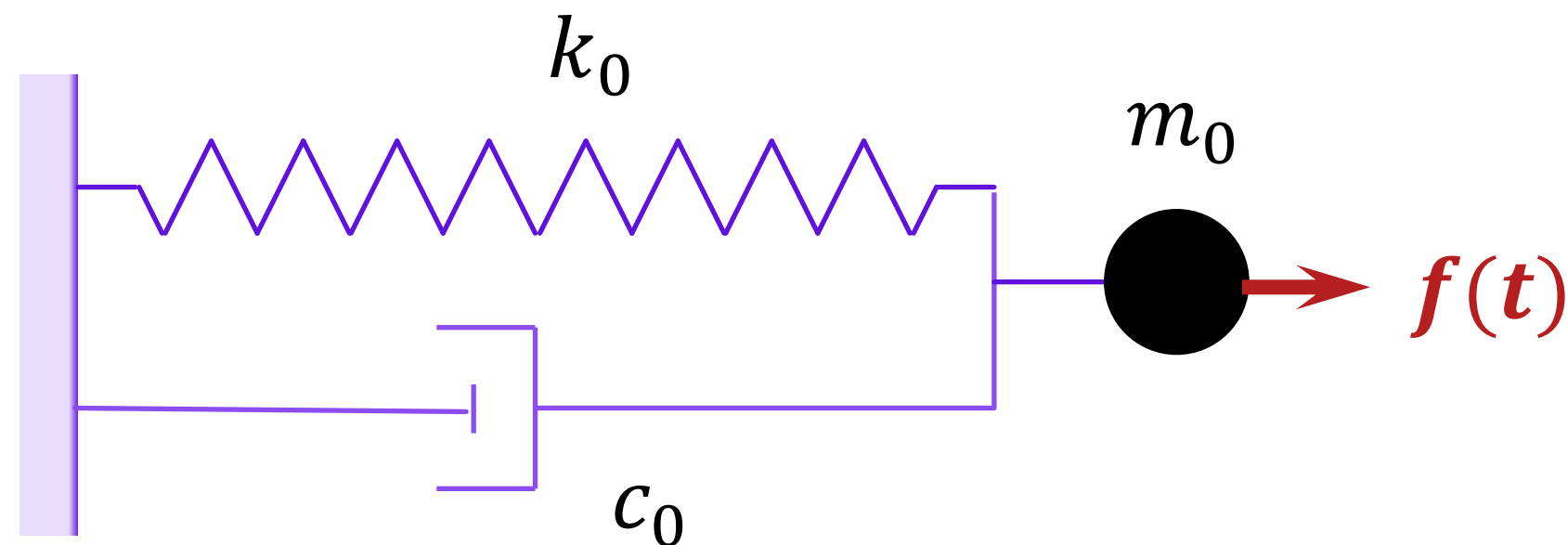
- Smartphones
 - iPhone
 - Android

} Download and install the app “*PointSolutions*”
- Computers (or Windows Phones)
 - Go to www.responseware.eu
- Choose **EUROPE Server** (if asked)
- Join session – **ME332**
- When asked – do not input your name. Enter as anonymous.



EPFL $f(t) = F \cos(\omega t) (1 + \cos(\omega t))$, harmoniques?

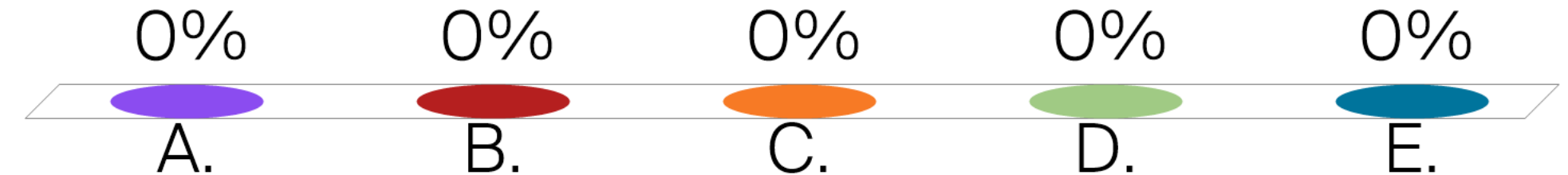
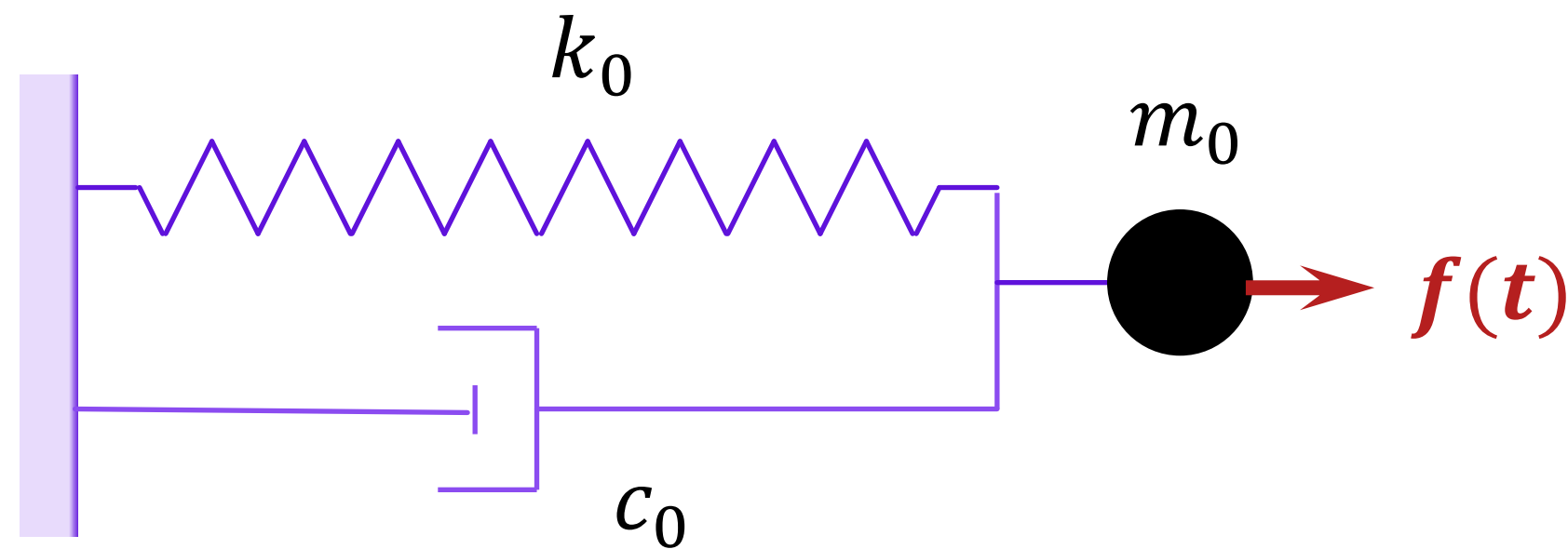
- A. $F_0 = F, F_1 = 0, F_2 = F$
- B. $F_0 = F, F_1 = F, F_2 = \frac{F}{2}$
- C. $F_0 = \frac{F}{2}, F_1 = F, F_2 = F, F_n = \frac{F}{n}$
- D. $F_0 = F, F_1 = F, F_3 = \frac{3F}{2}$
- E. On ne peut pas savoir
- F. Trop longue



EPFL À quelles ω on aura mouvement?

- A. ω_0
- B. ω_2
- C. ω
- D. $\omega, 2\omega$
- E. On ne peut pas savoir

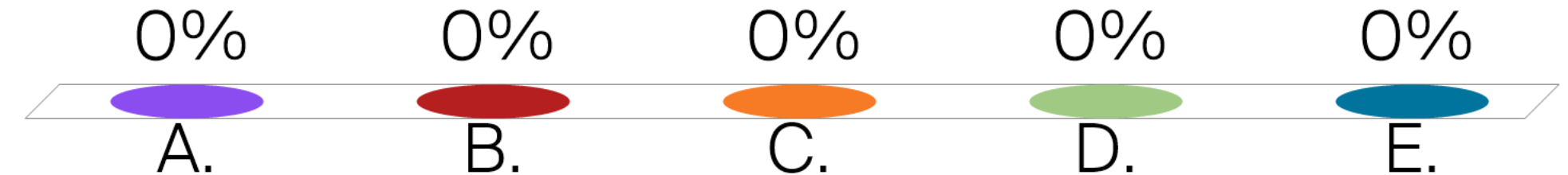
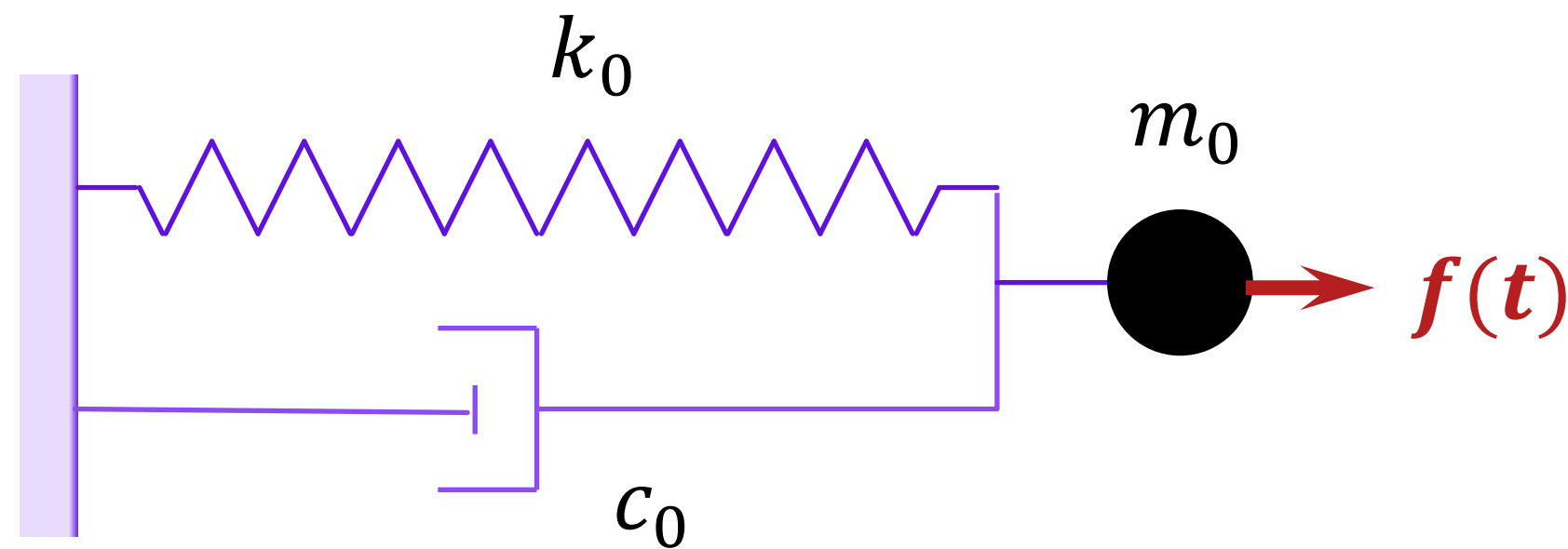
$$f(t) = F \cos(\omega t) (1 + \cos(\omega t))$$



EPFL Déplacement statique?

- A. $\frac{F}{2}$
- B. F
- C. $\frac{F}{k_0}$
- D. $\frac{F}{2k_0}$
- E. On ne peut pas savoir

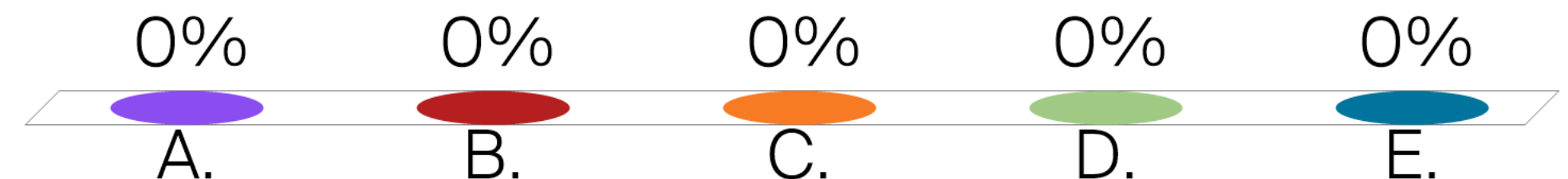
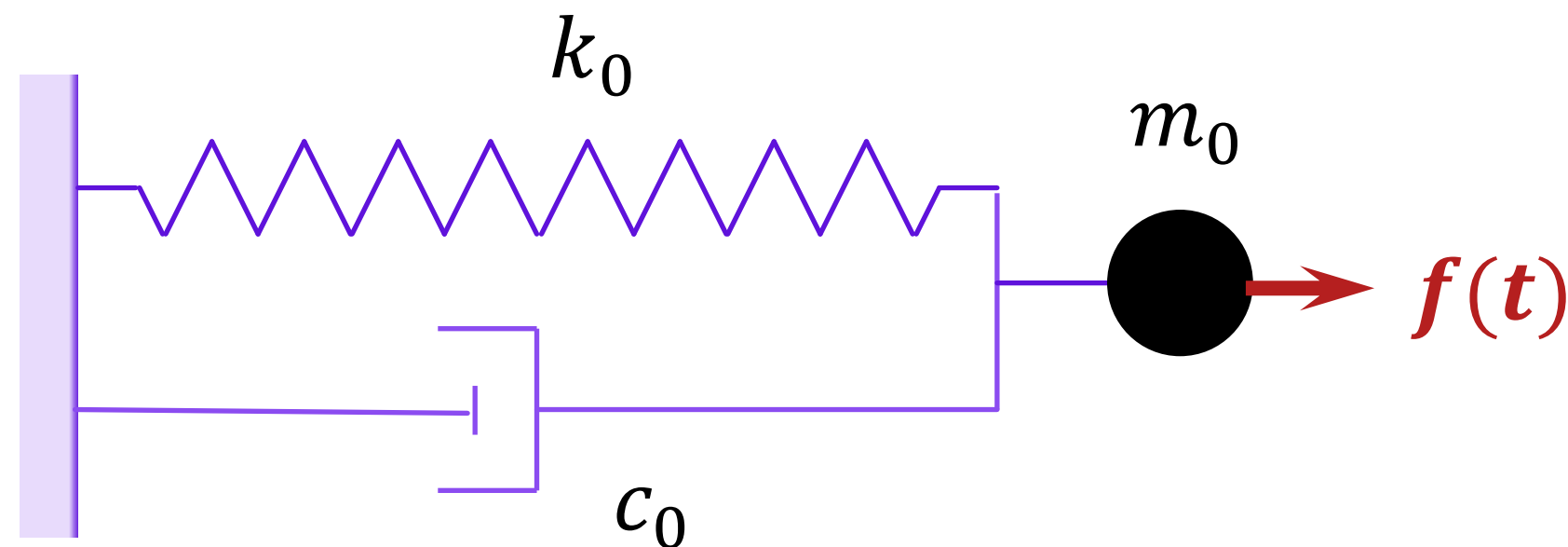
$$f(t) = F \cos(\omega t) (1 + \cos(\omega t))$$



$$X_1, \text{ si } \omega = \frac{1}{2} \sqrt{\frac{k_0}{m_0}}?$$

- A. $\frac{F}{k_0} 100$
- B. $\frac{F}{k_0} 0.05$
- C. $\frac{F}{k_0}$
- D. 0
- E. On ne peut pas savoir

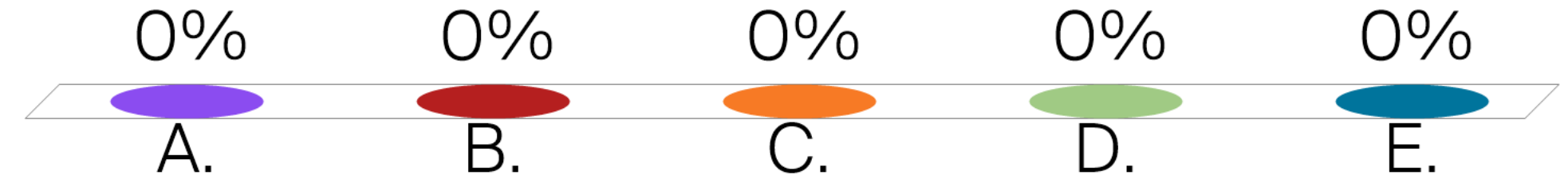
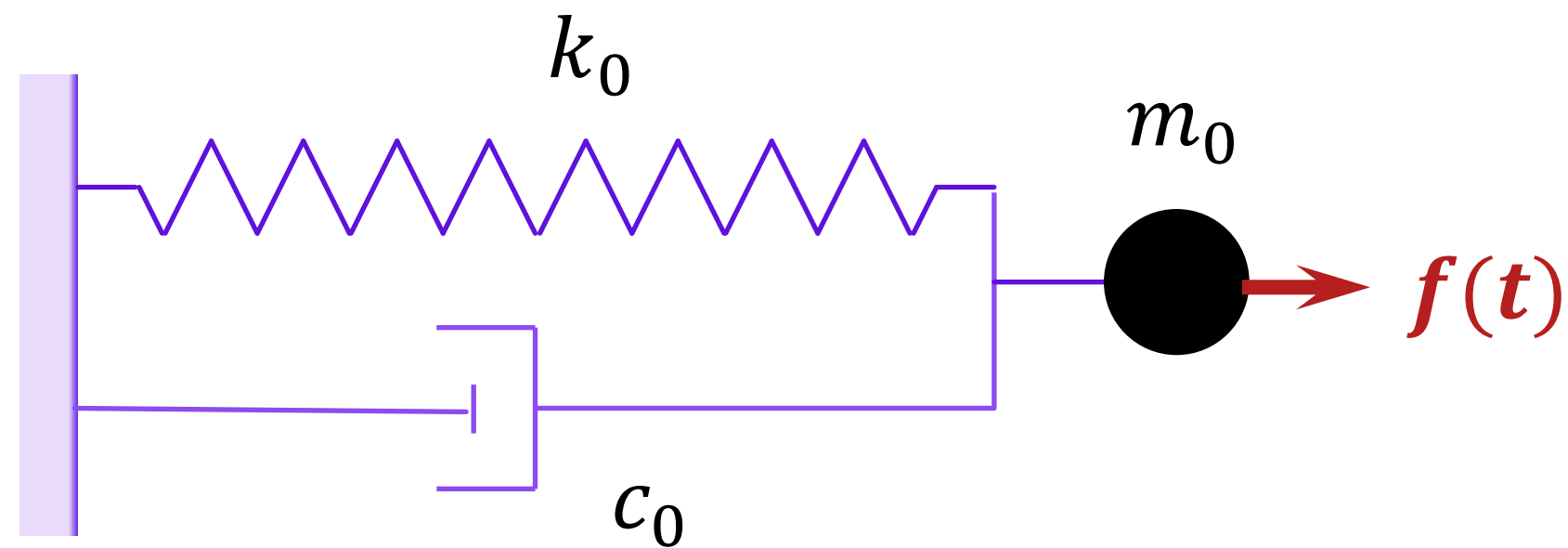
$$f(t) = F \cos(\omega t) (1 + \cos(\omega t))$$



$$X_3, \text{ si } \omega = \frac{1}{2} \sqrt{\frac{k_0}{m_0}}?$$

- A. $\frac{F}{k_0} 100$
- B. $\frac{F}{k_0} 0.05$
- C. $\frac{F}{k_0}$
- D. 0
- E. On ne peut pas savoir

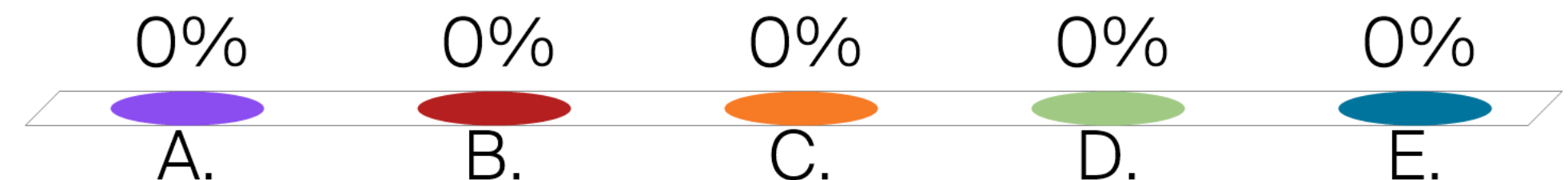
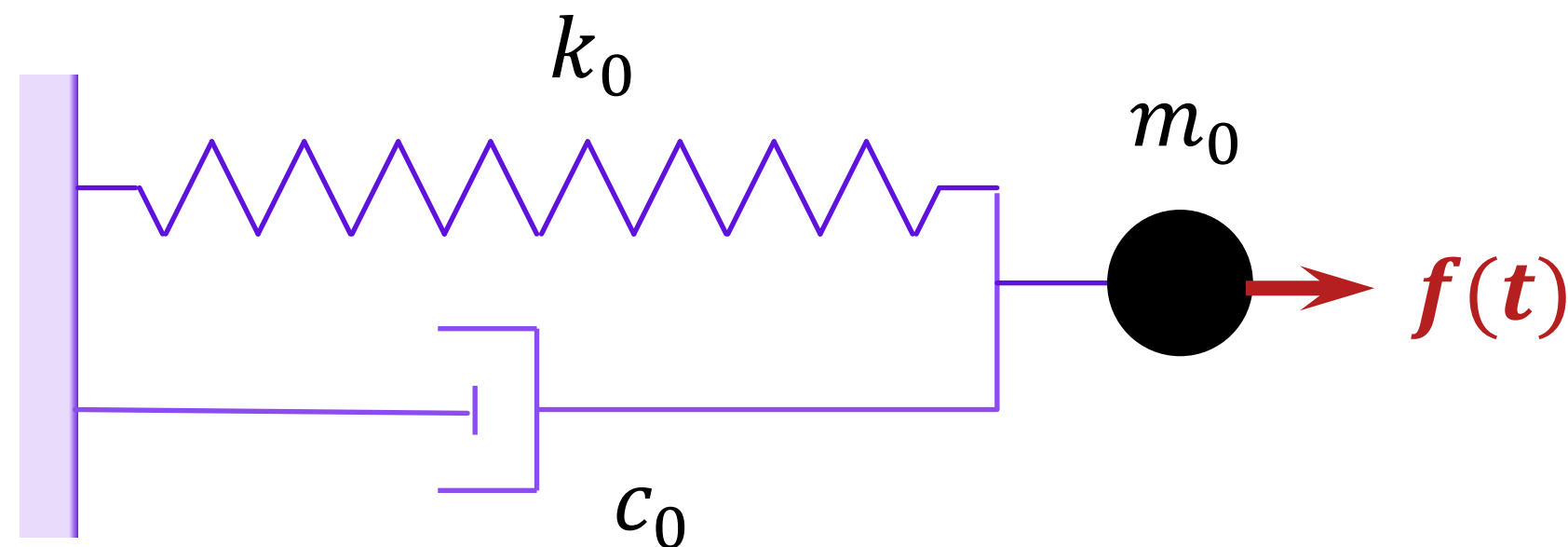
$$f(t) = F \cos(\omega t) (1 + \cos(\omega t))$$



$$X_1, \text{ si } \omega = \frac{1}{2} \sqrt{\frac{k_0}{m_0}}, \eta = 0.01?$$

- A. $\frac{4}{3} \frac{F}{k_0}$
- B. $\frac{16}{9} \frac{F}{k_0}$
- C. 0
- D. On ne peut pas savoir
- E. Aucune réponse dessus

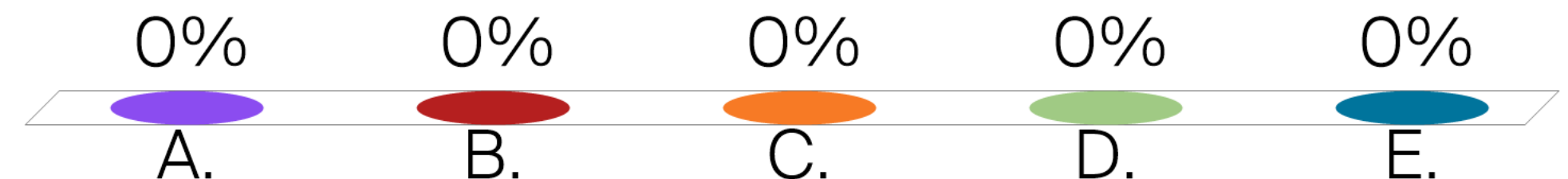
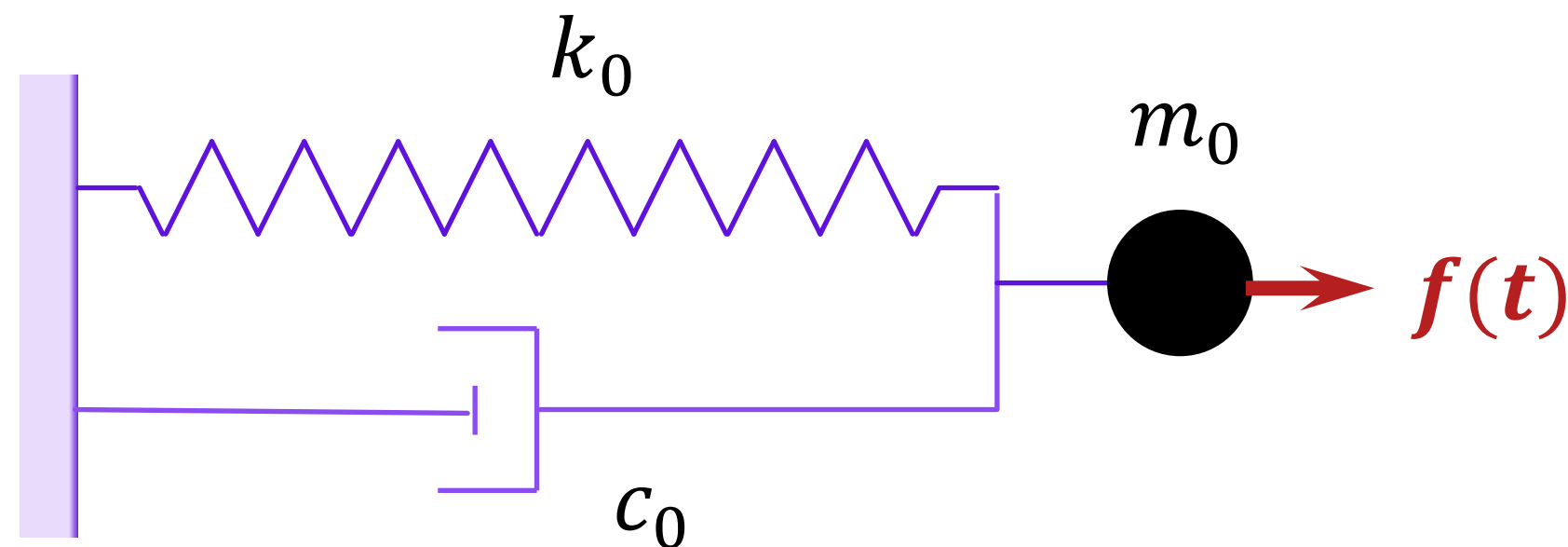
$$f(t) = F \cos(\omega t) (1 + \cos(\omega t))$$



$$X_2, \text{ si } \omega = \frac{1}{2} \sqrt{\frac{k_0}{m_0}}, \eta = 0.01?$$

- A. $100 \frac{F}{k_0}$
- B. $50 \frac{F}{k_0}$
- C. $0.01 \frac{F}{k_0}$
- D. 0
- E. Aucune réponse dessus

$$f(t) = F \cos(\omega t) (1 + \cos(\omega t))$$



$$X_2, \text{ si } \omega = \sqrt{\frac{k_0}{m_0}}, \eta = 0.01?$$

A. $0.01 \frac{F}{k_0}$

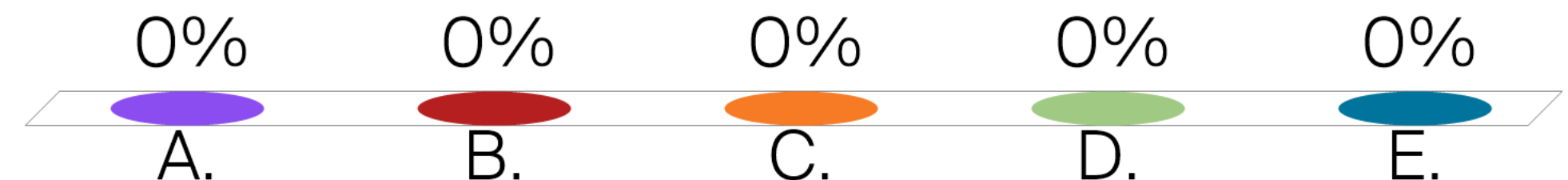
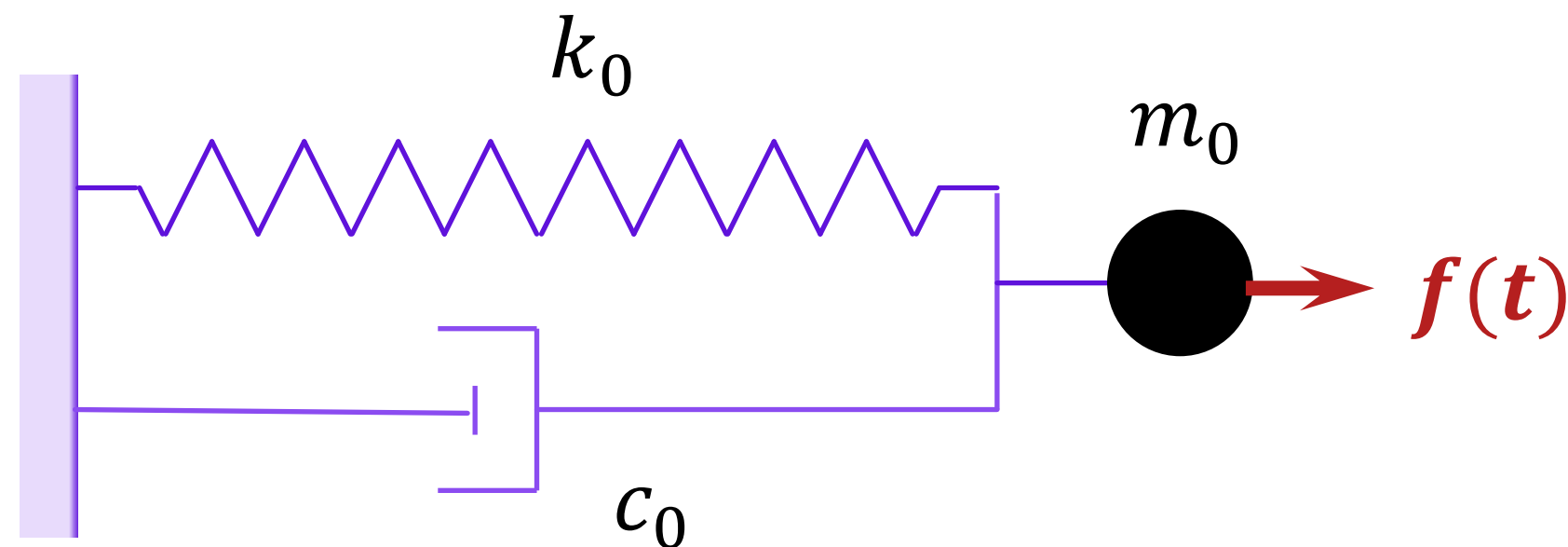
B. $\frac{1}{3} \frac{F}{k_0}$

C. $3 \frac{F}{k_0}$

D. 0

E. Aucune réponse dessus

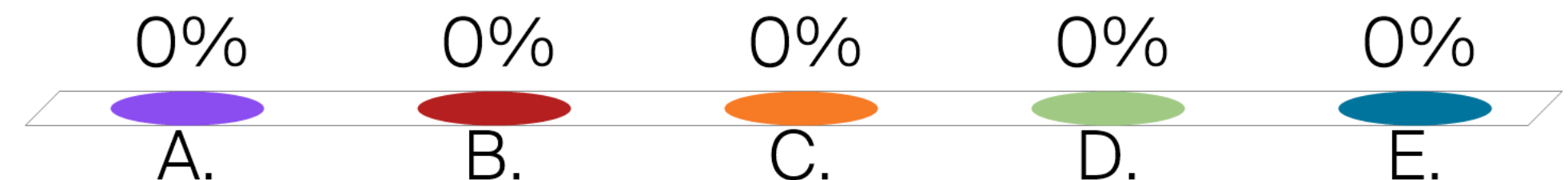
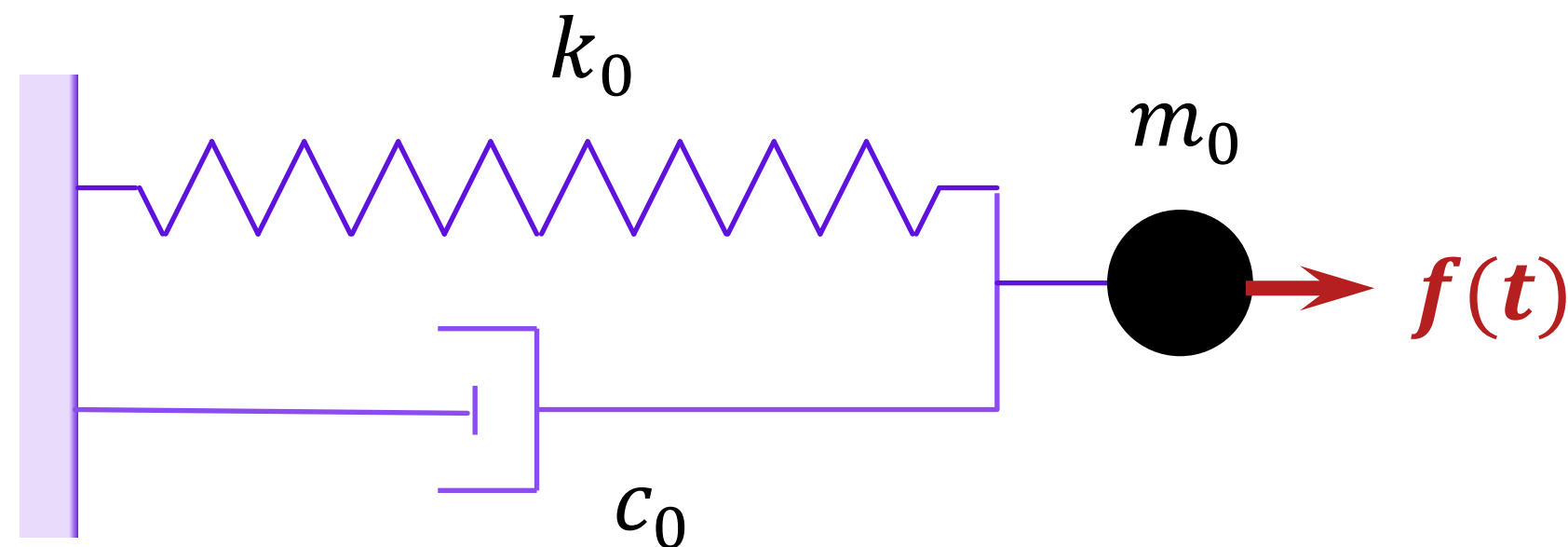
$$f(t) = F \cos(\omega t) (1 + \cos(\omega t))$$



$$X_1, \text{ si } \omega = \sqrt{\frac{k_0}{m_0}}, \eta = 0.01?$$

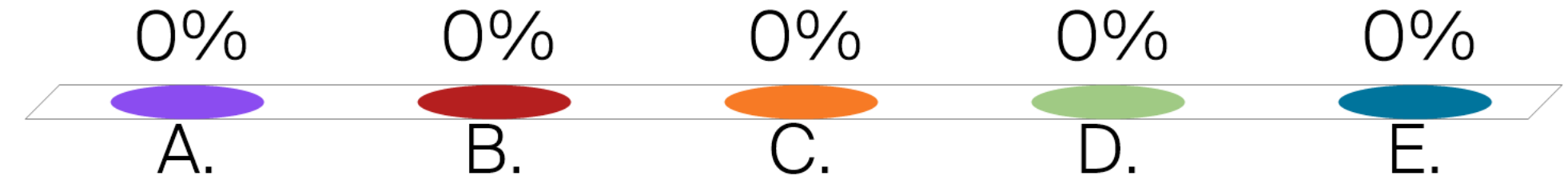
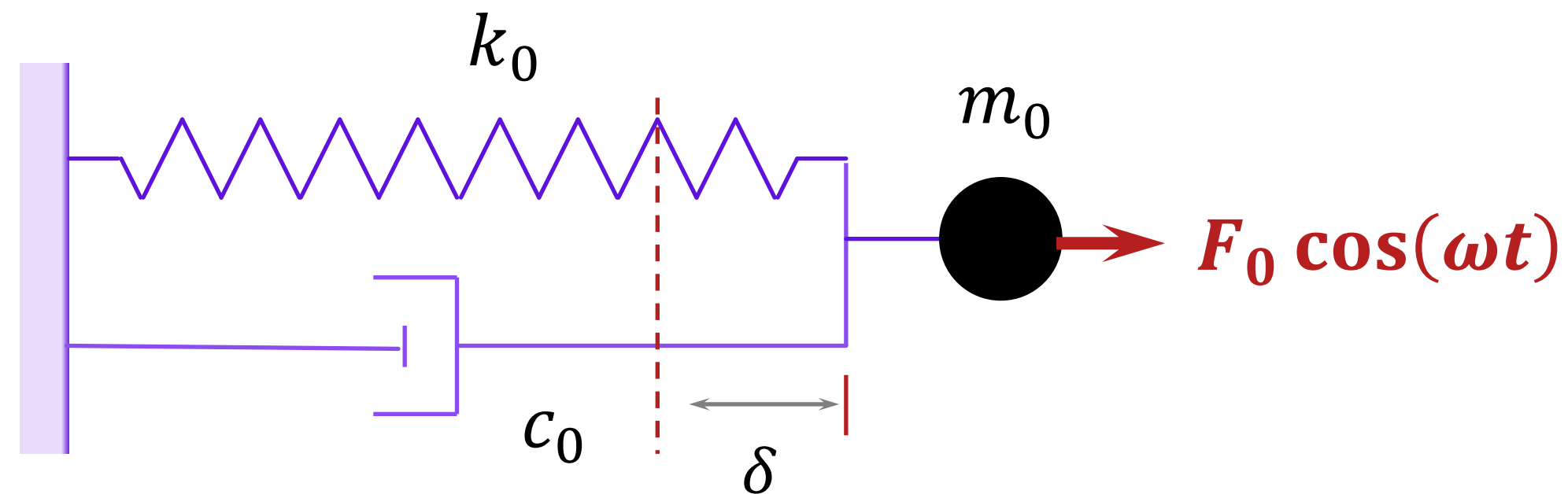
- A. $100 \frac{F}{k_0}$
- B. $50 \frac{F}{k_0}$
- C. $0.01 \frac{F}{k_0}$
- D. 0
- E. Aucune réponse dessus

$$f(t) = F \cos(\omega t) (1 + \cos(\omega t))$$



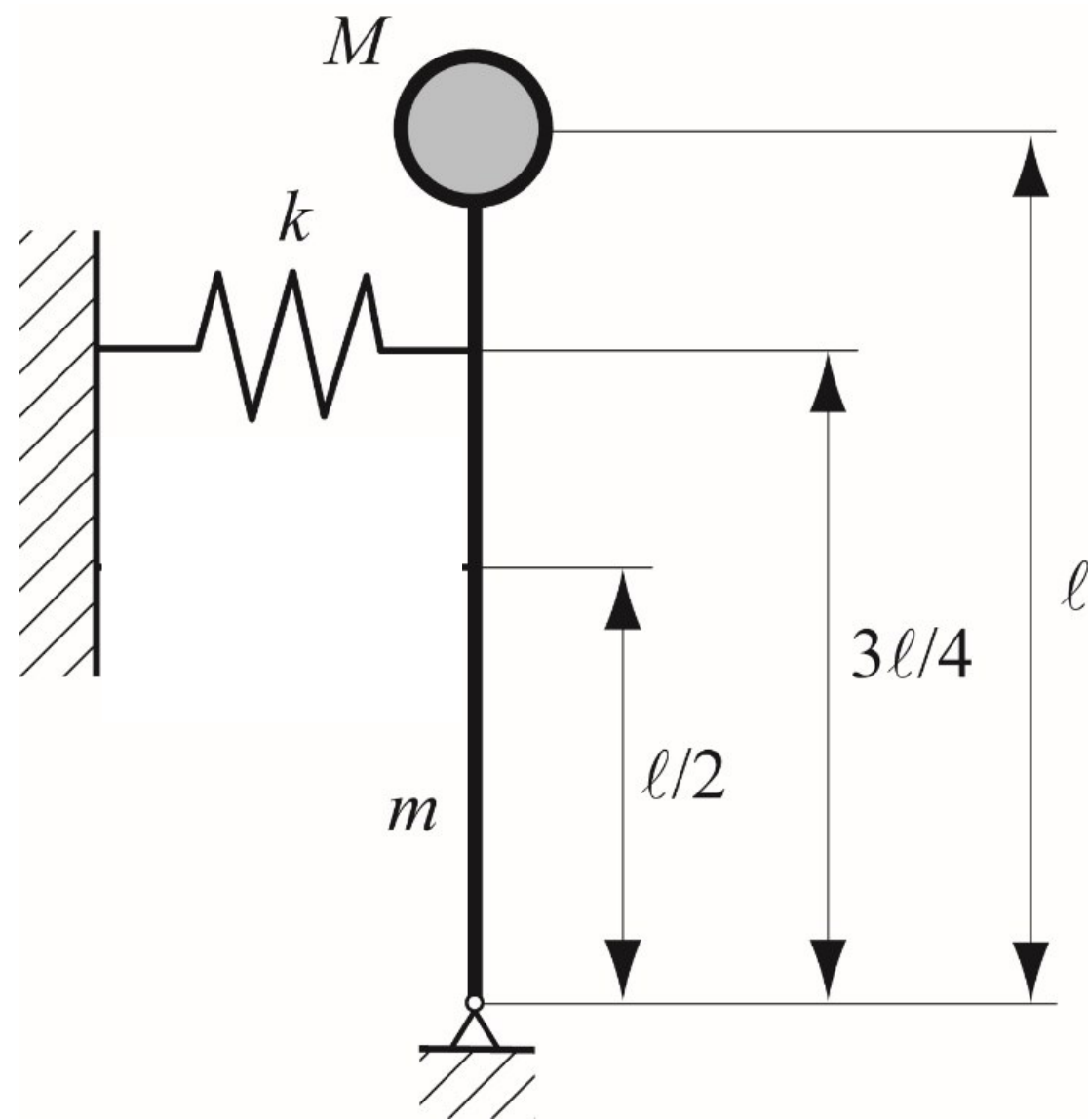
EPFL Régime permanent – Maximum Amplitude

- A. δ
- B. $\omega_2 = \omega_0 \sqrt{1 - 2\eta^2}$
- C. F_0/k
- D. $\frac{F_0/k}{2\eta\sqrt{1-\eta^2}}$
- E. On ne peut pas savoir



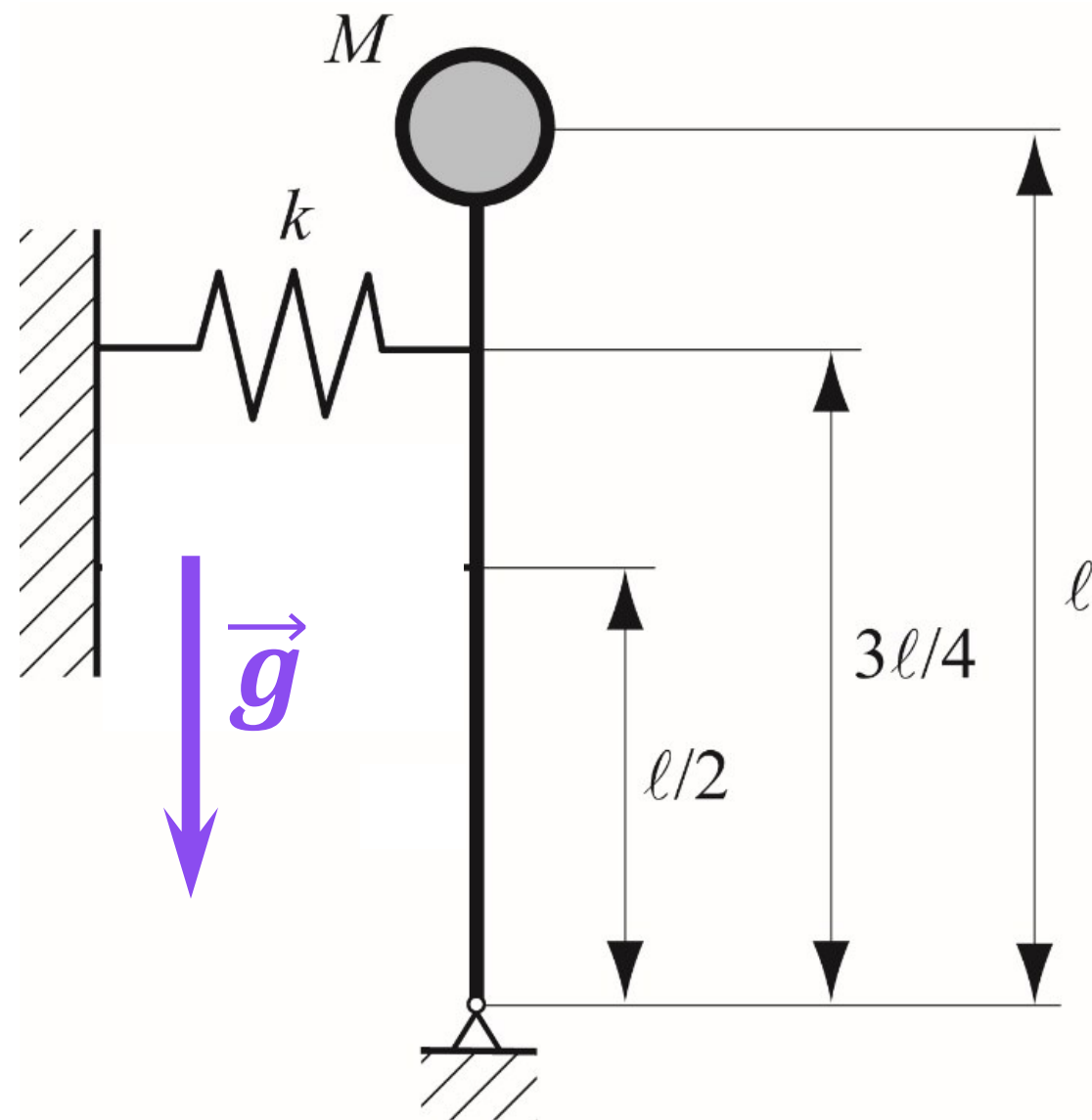
EPFL Fréquence ω_0 ?

- A. $\omega_0 = \sqrt{k/(M + m)}$
- B. $\omega_0 = 3/4\sqrt{k/(M + 3m)}$
- C. $\omega_0 = \sqrt{k/(M + m/3)}$
- D. $\omega_0 = 3/4\sqrt{k/(M + m/3)}$



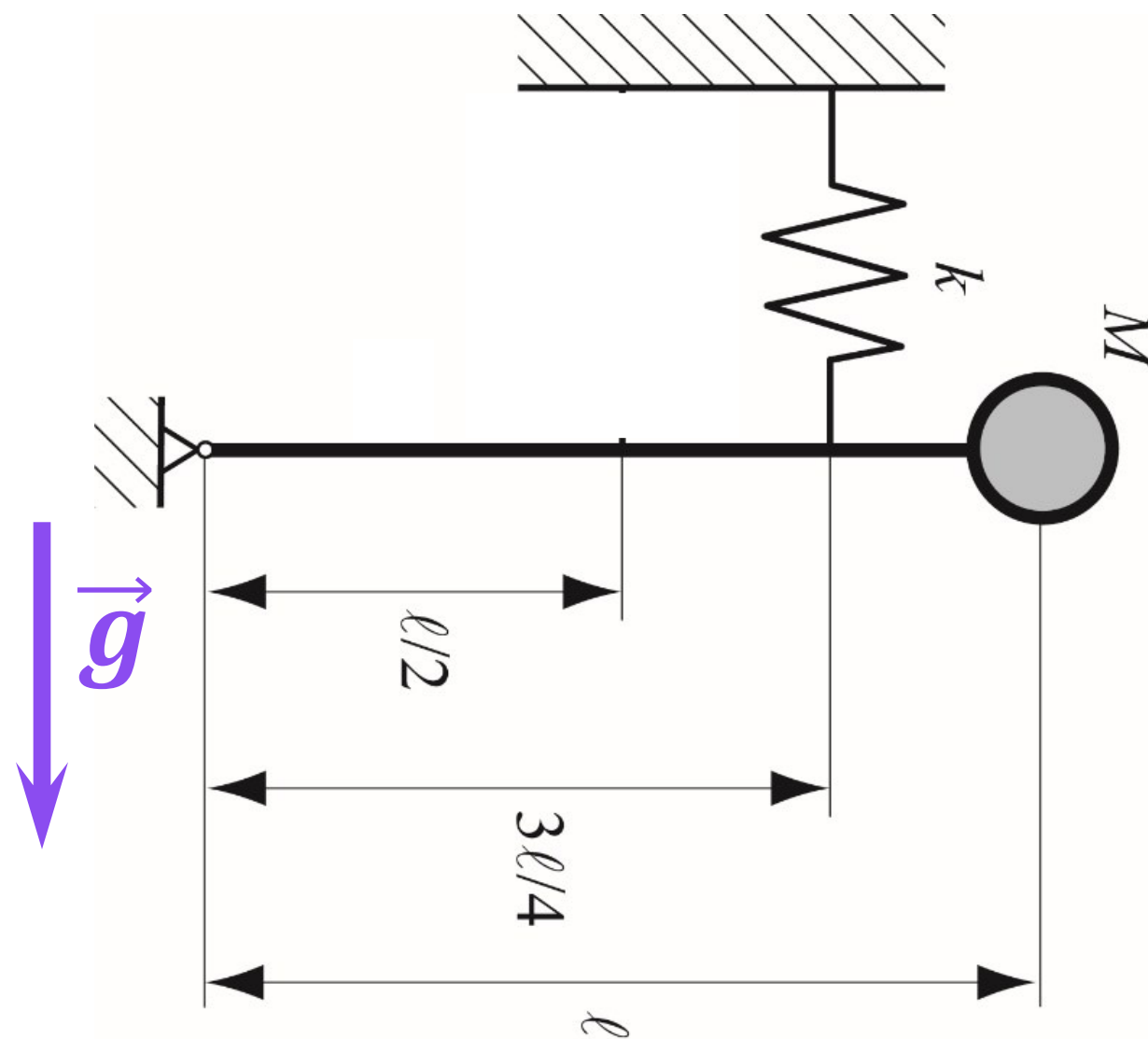
EPFL Fréquence ω_0 ?

- A. $\omega_0 = \sqrt{k/M}$
- B. $\omega_0 = 3/4\sqrt{k/M}$
- C. $\omega_0 = \sqrt{9/16 k/M + g/L}$
- D. $\omega_0 = \sqrt{9/16 k/M - g/L}$



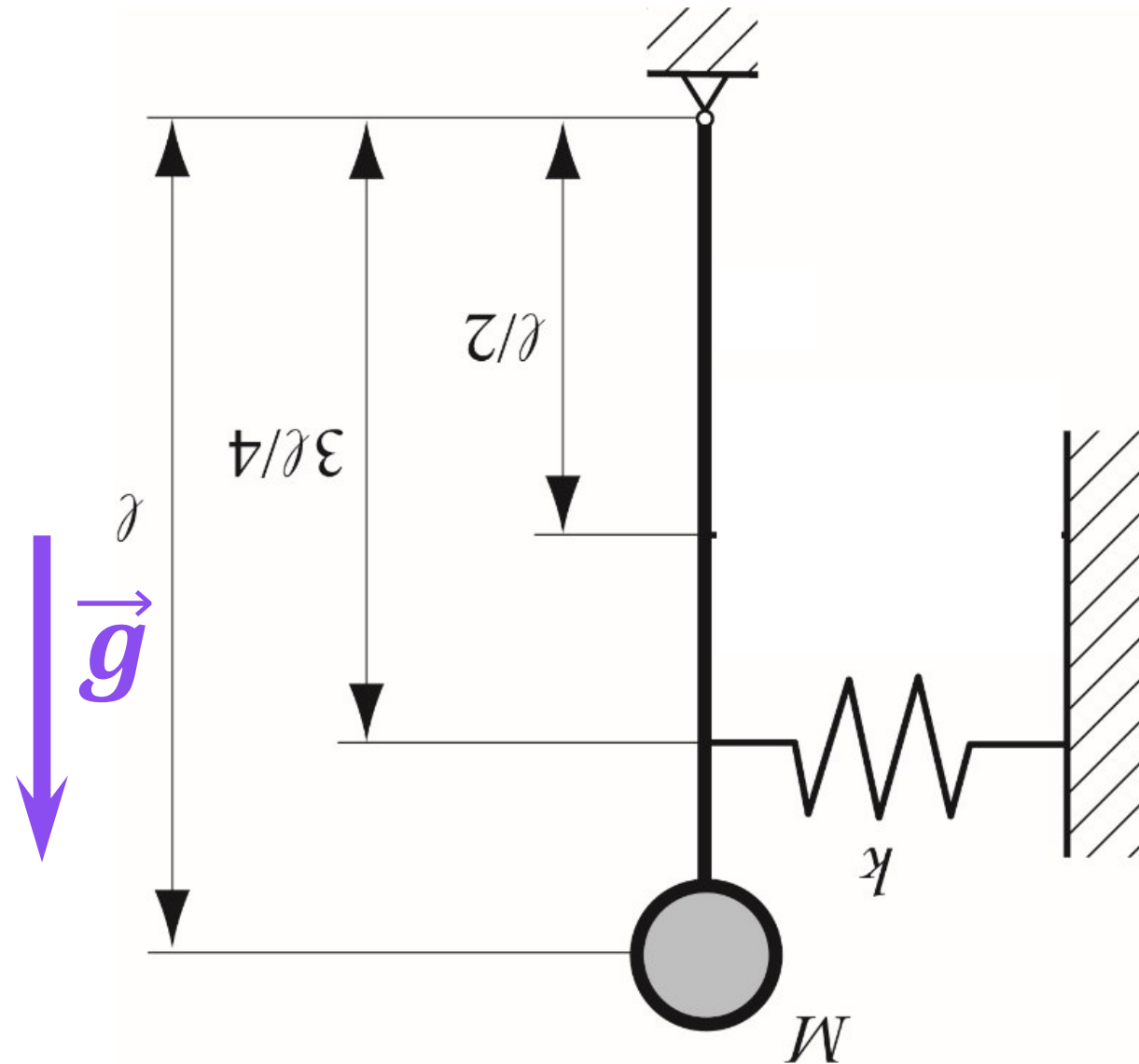
EPFL Fréquence ω_0 ?

- A. $\omega_0 = \sqrt{k/M}$
- B. $\omega_0 = 3/4\sqrt{k/M}$
- C. $\omega_0 = \sqrt{9/16 k/M + g/L}$
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EPFL Fréquence ω_0 ?

- A. $\omega_0 = \sqrt{k/M}$
- B. $\omega_0 = 3/4\sqrt{k/M}$
- C. $\omega_0 = \sqrt{9/16 k/M + g/L}$
- D. $\omega_0 = \sqrt{9/16 k/M - g/L}$



EPFL Fréquence ω_1 ?

$$\omega_0 = \frac{3}{4} \sqrt{\frac{k}{M}}$$

A. $\omega_1 = \omega_0$

B. $\omega_1 = \omega_0 \sqrt{1 - \frac{c}{2k}}$

C. $\omega_1 = \omega_0 \sqrt{1 - \frac{4c^2}{9Mk}}$

D. $\omega_1 = \omega_0 \sqrt{1 - \frac{c^2}{144Mk}}$

