

BUKTI KORESPONDENSI

Judul Artikel	Comparison of proportional-derivative and active-force controls on vibration of a flexible single-link manipulator using finite-element method
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Reviewer Recommendations

2. Accept as full paper with revision

Major Comments

Reviewer 1:

The main theme of this manuscript is a comparison of PD and Active force controls of a flexible link. For the manuscript the reviewer has questions and comments (see Minor Comments). Moreover, it seems that this paper is not an extended version of the paper GS16-1 in the proceedings of the AROB19th because the authors use the paper GS16-1 as a reference. The authors should revise the manuscript based on the paper GS16-1.

Reviewer 2:

This manuscript has some typos, you must correct these. In eq. (18), $\$K\$$ is a mistake of $\$K_{pa}\$$. And "maximum" is a mistake of "maximum".

It is necessary to describe the purpose of comparing Model A with model B. Does the difference of the essential characteristic between model A and model B appear in the numerical example?

Minor Comments

Reviewer 1:

- (1) Column 3, paragraph 1, Section 2, p.2: $\$v(t)\$$ and $\$\phi(t)\$$ are required subscript $\$i\$$. Moreover, you should explain about $\$i\$$.
- (2) Column 5, paragraph 1, Section 2, p.2: "z-axis" is unclear. You should explain z-axis using show an appropriate figure.
- (3) Equation (2): $\$x_i\$$ is not defined.
- (4) Equation (4): What is difference of $\$\epsilon_i\$$ and $\$\epsilon_{x_i}\$$? Moreover, $\$y_i\$$ is not defined.
- (5) Equation (5): The authors write that "equation of motion of the i-th element is given by Eq.(5)." First, how do you obtain Eq.(5)? There is no explanation about the derivation of Eq.(5) not only in this manuscript but also in the reference [11]. Second, there are no explanation about $\$\theta\$$ and $\$f_i\$$. Moreover, the authors should show the all element of $\$M_i\$$, $\$C_i\$$, $\$K_i\$$.
- (6) Fig. 3: Where are the single-link manipulator, clamp part and actuator? There is no explicit explanation in this figure.
- (7) Column 1-3 from the bottom of the paragraph 1, subsection 3.1, p.3: Table 1 should show this manuscript.
- (8) Equation (7): What is mean of this equation? $\$M_2 = d_1 E\$$ and $\$M_3 = -d_1 E\$$?
- (9) Equation (9): How do you obtain Eq.(9)? There is no explanation about the derivation of Eq.(9) not only in this manuscript but also in the reference [11].
- (10) Equation (13): There is no explanation about the configuration of this vector. Moreover, $\$K_p\$$ and $\$K_d\$$ are not defined.
- (11) Fig. 5: There is no explanation and configuration about $\$G_p(s)\$$.

(12) Equation (18):
\$K\$ is a typo.

LETTER TO THE REVIEWERS (1940074)

Title: Comparison of proportional-derivative and active-force controls on vibration of a flexible single-link manipulator using finite-element method

Authors: Abdul Kadir Muhammad, Shingo Okamoto, and Jae Hoon Lee

ABOUT MAJOR COMMENTS

Answers to the Reviewer 1

The manuscript 1940074 is clearly an extended version of the paper GS16-1 of the AROB 19th 2014 proceeding, because the manuscript 1940074 was extended from only the proportional-derivative (PD) strategy to two control strategies namely the PD and active-force (AF) one. The focus of this new manuscript is to show the superiority of the AF controller compared to the PD one.

The authors use the paper GS16-1 as reference to explain that the formulation and computational codes of the flexible single-link system had been validated. The validation results were presented in sub-chapter 3.3 – 3.6 (page 384 – 386) of the AROB 19th 2014 proceeding.

The manuscript 1940074 was revised based on the paper GS16-1 of the AROB 19th 2014 proceeding. Then the manuscript was expanded from 5 to 6 pages due to the added explanations, equations, figures and tables. However, the explanation about the existing research in introduction was reduced from 10 to 8 papers due to customizing the pages.

Answers to the Reviewer 2

The typo of K_p was changed to K_{pa} (Section 4, Eq. (25), p.5).

The typo of “maxsimum” was changed to “maximum” (Section 4.2, paragraph 2, p.6).

The purpose of comparing Model A with B is described in (Section 3.2 paragraph 1, p.3). The difference of Models A and B in numerical example appears as the mass of the end-effector and the external force due to the end-effector.

ABOUT MINOR COMMENTS

Answers to the Reviewer 1

(1) v and ψ was changed to v_i and ψ_i . The meaning of symbol of i was explained in (Section 2, paragraph 2, p.2).

(2) z -axis was explained using Fig.1. and sentences in (Section 2, paragraph 1, p.2).

A figure of the position vector of an arbitrary point P in the link in the global and rotating coordinate frames was added as Fig.1. Explanation of the Fig.1 was presented including equation of the velocity vector of the arbitrary point P in (Section 2, paragraph 1, p.2).

(3) x_i was defined after Eq. (3) (Section 2, p.2) .

(4) ε_i is the same with ε_{xi} because the link is coincides with x_i -axis therefore ε_i can be obtained using formulation of ε_{xi} therefore authors decided to use only ε_i (Eq. (5) in Section 2, p.3). The y_i has been defined after Eq. (5) (Section 2, p.3).

(5) $\theta(t)$ was defined in (Section 2, paragraph 1, p.2). Eq. (5) was explained and all elements of M_i , C_i and K_i were shown in (Section 2, p.3).

(6) The new figure was presented in (Fig. 4, p.4).

(7) Table 1 was presented in (Table1, p.4).

(8) Eq. (12) was changed from to . Eq. (12) means M_2 and M_3 proportional to E , M_2 opposites to M_3 . They were explained in the manuscript in (Section 3, paragraph 3, p.3). E d M 1 3 , 2 □ □ E d M M 1 3 2 , □ □

(9) Eq. (14) was explained and all elements of M_{icm} and f_{icm} were shown in (Section 3.2, paragraph 1 and 2, p.3 and p.4).

(10) Configuration of vector $G_c(s)$ was explained and K_p as well as K_d were defined in (Section 4.1.1, paragraph 2, p.5).

(11) $G_p(s)$ was explained in (Section 4.1.1, paragraph 3, p.5).

(12) Typo of K_p was changed to K_{pa} in (Section 4, Eq. (25), p.5).