Firstly, I do a research on a paper focus on the tendon-robot. The researchers conducted series of experiments to access the ability of the robot to maintain certain visualization angle for Endoscopic Surgery. (Focus on the tendon-robot's parameters and its proper adjusting range, as well as the

1. First, we collected the friction coefficient between guides and tendon wires, namely constant μ in (10), to plug the measurement value into the FKM. All our data in these studies were obtained using this friction coefficient. We prepared eyelets and wires as test pieces for measurement.
2. The second set of experiments simulated the variability of the tip position at the 180 ◦ angle and 45◦ angle view. We calculated possible curvature combinations of the two robot sections and their postures by using an FKM that covers the tension limitation of the robot.
3. The third set of experiments involves a physical prototype to validate the postures against the simulations. We developed a 10:1 scale prototype of the two-section robot for validation. By pulling the two tendon wires for the two sections of the prototype, we observed postures in the motion range by maintaining the 180 ◦ angle view. We compared the measured positions of every cell with values predicted by the FKM, as well as a conventional model without the friction effect. Coventional model used a PCCA [4], [5], [23].
4. The fourth set of experiments measured the posture of the robot with tension control to validate the mapping of tension in tendons to the robot posture by the FKM. We observed the robot posture with a single tendon and an antagonistic pair of tendons, and compared the measured postures to the values predicted by the FKM and PCCA.
5. The last set of experiments involved 2:1 scale prototype to assess if the miniature tendon-robot can be fabricated and controlled by the FKM-based tension control. An 1:1 scale model, that requires more sophisticated material selection and fabrication is in development at the time of submission of this paper.

Secondly, the paper The reports the development of an underactuated tendon driven prosthetic hand.

Compact low-cost robotic hand;

The initial design of the hand presented in this work illustrates the utility of 3D printing technology in prototype as well as final product development.

Thirdly,

We conclude from this validation that these computational methods are effective at predicting the performance of drastically different tendon-driven robotic finger (or manipulator) designs, and are therefore a useful design tool. Various benefits of fully utilizing this design tool include:

(1)

Minimization of weight: if a superior design has a force-production performance twice that of an inferior design, the superior design's actuators only need to be half the strength of the inferior design's to match the inferior design's performance, which in general corresponds to a large reduction in weight of the actuators.

(2)

Minimization of size: if a superior design has a force-production performance twice that of an inferior design, the superior design's moment arms only need to be half the size of the inferior design's to match the inferior design's performance, which could be used to half the overall

thickness of the finger (or manipulator, or minimally-invasive surgical device).
(3)
Minimization of number of tendons (and therefore actuators): If a design with less tendons (such as an N + 1 design) can be synthesized with the same force-production performance as that of one with more tendons (such as a 2N design), then the actuator system can be simplified and less space to rout the tendons inside the finger (or manipulator, or minimally-invasive surgical device) is needed.