Purpose:

- Four million chronic stroke survivors with hemiparesis or other similar conditions in the US.
- Another six million in developed countries globally.
    - Greatly inhibit activities of daily living (ADL)
- RTP (repetitive task practice) is used to improve hand strength, accuracy, and range of motion.
    - These methods are labor intensive, costly, and slow thus may cause patience challenge compliance.
- System: makes physical therapy more affordable, accessible, results driven, increasing potential.

Points:

- A human hand can generate up to 300 N and 450 N in the cases of females and males respectively
    - However, maximum grip strength isn't necessary to reproduce in order to live a normal life since most objects of daily life do not weigh more than 1.5 kg,.

    - Coefficient of friction of 0.225 and distal tip force of around 7.3 N per soft actuator is needed to achieve the grip

- Regarding the control requirements, a minimum controller bandwidth of 10 Hz (or 20 times that of the soft actuator) is ideal.

- To support repetitive rehabilitation and assistance with ADL, two and six hours are required for continuous and intermittent operation respectively.

- Friction in the tubing is a factor affecting the response time of the glove. To reduce it a wider tube could be used or a higher fluidity capacity pump.

- Using a faster valve response time could reduce the overshoot that occurs due to pressure build up.

Design:

- Multi-segment joint actuators where a single actuator is split into multiple segments that can either extend or bend (this is done by adding or removing of strain limiting layer)

- Sliding mode controller was used since it doesn't require the system to be explicitly modeled, which is highly appreciated in complex systems.