SysID Lab 1: (Re)introduction to Matlab. Using the DC motor

Follow the Matlab tutorial indicated by the teaching assistant, and then read the DC motor usage guide. Once that is done:

- Connect the motor to the computer using USB, make sure the system is plugged in, and configure it per the guide.
- Generate a vector of integer values k between 1 and 150 (discrete time steps).
- Compute a vector of corresponding input values u, where:

$$u_k = \begin{cases} 1, & k = 20 \\ 0, & \text{otherwise} \end{cases}$$

- Obtain the DC motor's response to the input signal u by calling:

```
y = DCMRun.run(u)
```

- Plot the response y.
- Compute from y a new signal h which is zero in steady-state and only contains the exponentially decreasing range. So:

$$h_k = y_{k+20} - y_{ss}$$

  where you read y_{ss} directly on the graph. Question: what is signal h called?
- We will approximate h with signal x so that $x_k = \alpha \cdot \exp(-\beta k)$. For any given values of α, β, plot x and h in the same figure.
- Tune α and β manually so that the two signals match as closely as possible.

If everything worked correctly, you should obtain a graph similar to the following: