Sigmoid:

$$\sigma(x) = \frac{1}{1+e^{-x}} \; ; \; \frac{d\sigma(x)}{dx} = \frac{d\left(\frac{1}{1+e^{-x}}\right)}{dx}$$

$$\Rightarrow \sigma'(x) = \frac{e^{-x}+1-1}{(1+e^{-x})^2} = \frac{1}{(1+e^{-x})} - \frac{1}{(1+e^{-x})^2}$$

$$= \sigma(1-\sigma)$$

```
%% sigmoid function generation
arr = -10:1/1000:10;
sigmoid = 1./(1 + exp(-arr));

figure;
subplot(2,1,1);
plot(arr, sigmoid); title("Sigmoid function");
grid on;

% derivative of sigmoid function
sigmoid_derivative = sigmoid.*(1 - sigmoid);
subplot(2,1,2);
plot(arr, sigmoid_derivative); title("Derivative of Sigmoid function");
grid on;
```