# Diagnosis Function

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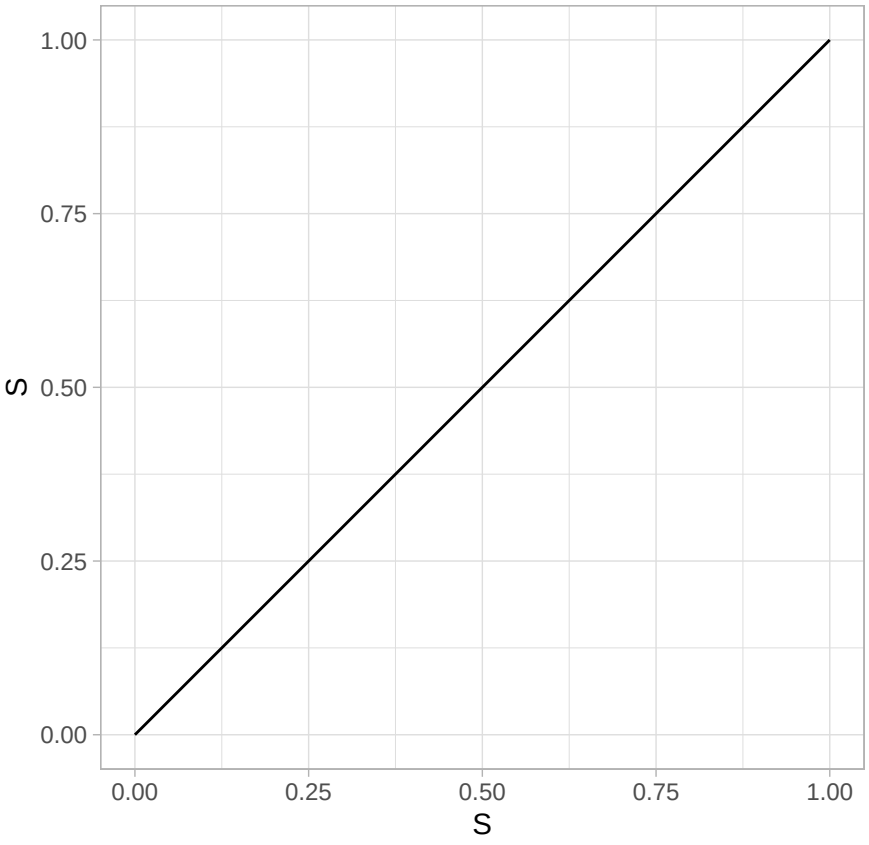
This is a quick and dirty space for me to play with some different diagnosis functions.

## Identity

One thing that I've been doing for simplicity is using the identity function

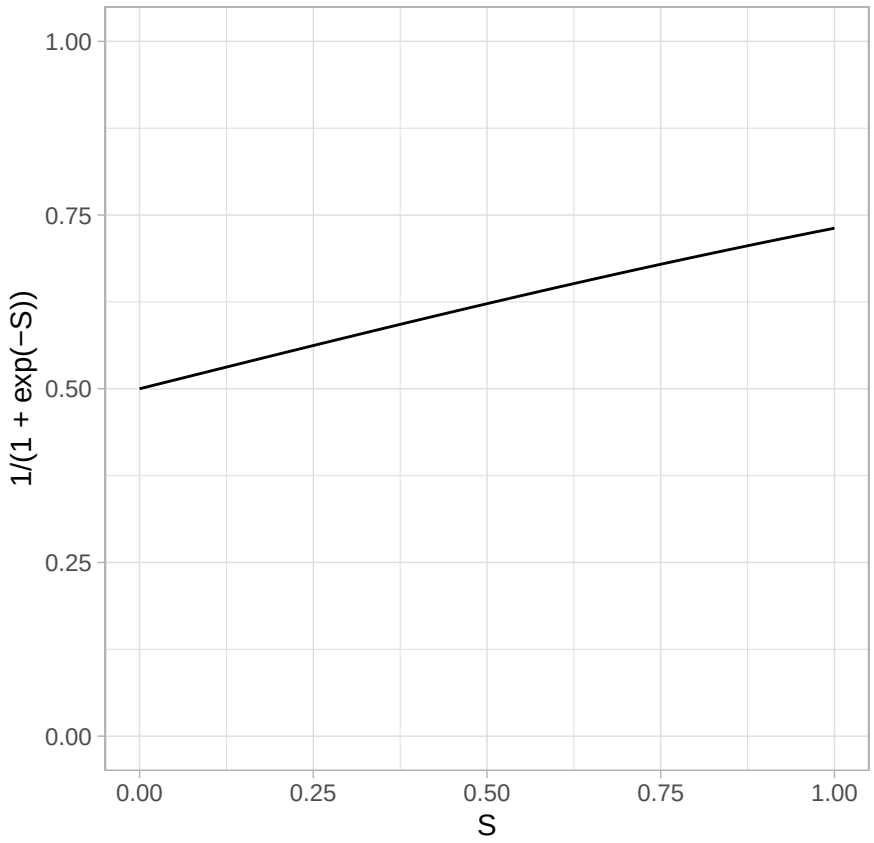
$$\phi(S_i) = S_i$$




## Sigmoid

An intuitive tool could be the sigmoid function:

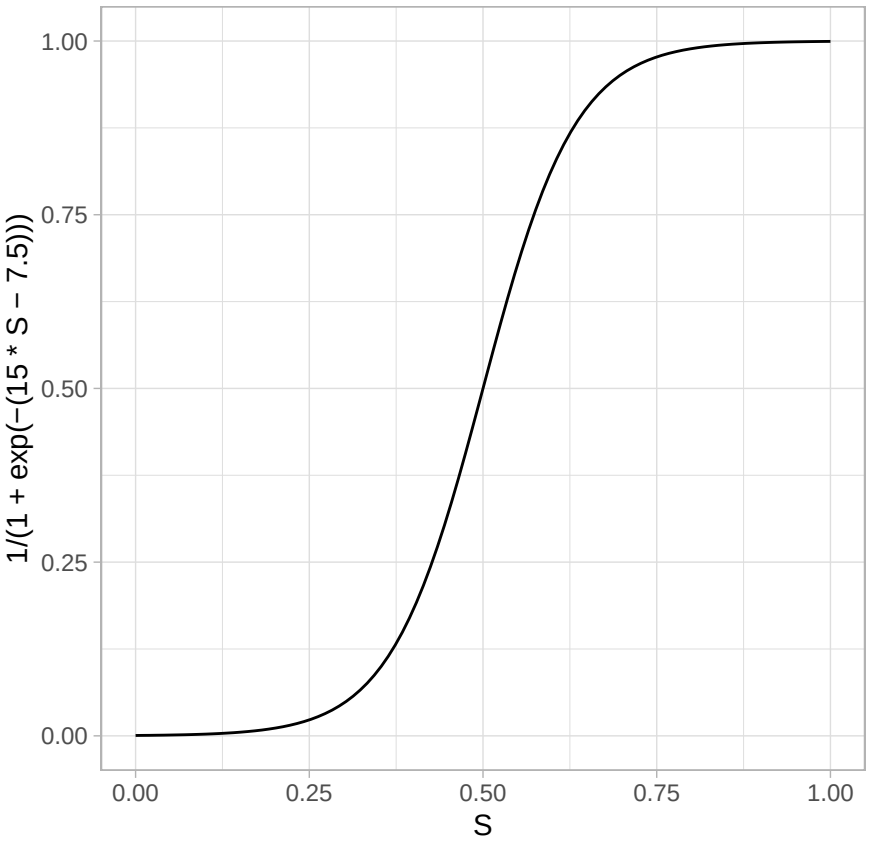
$$\phi(S_i) = \frac{1}{1 + exp(-S_i)}$$




This could be parametrized a little better for the $[0, 1] \rightarrow [0, 1]$ mapping:

$$\phi(S_i) = \frac{1}{1 + exp(-(\beta_0 + \beta_1 S_i))}$$

For example, letting $\beta_1 = 15$ and $\beta_0 = -7.5$ gives a function more like:

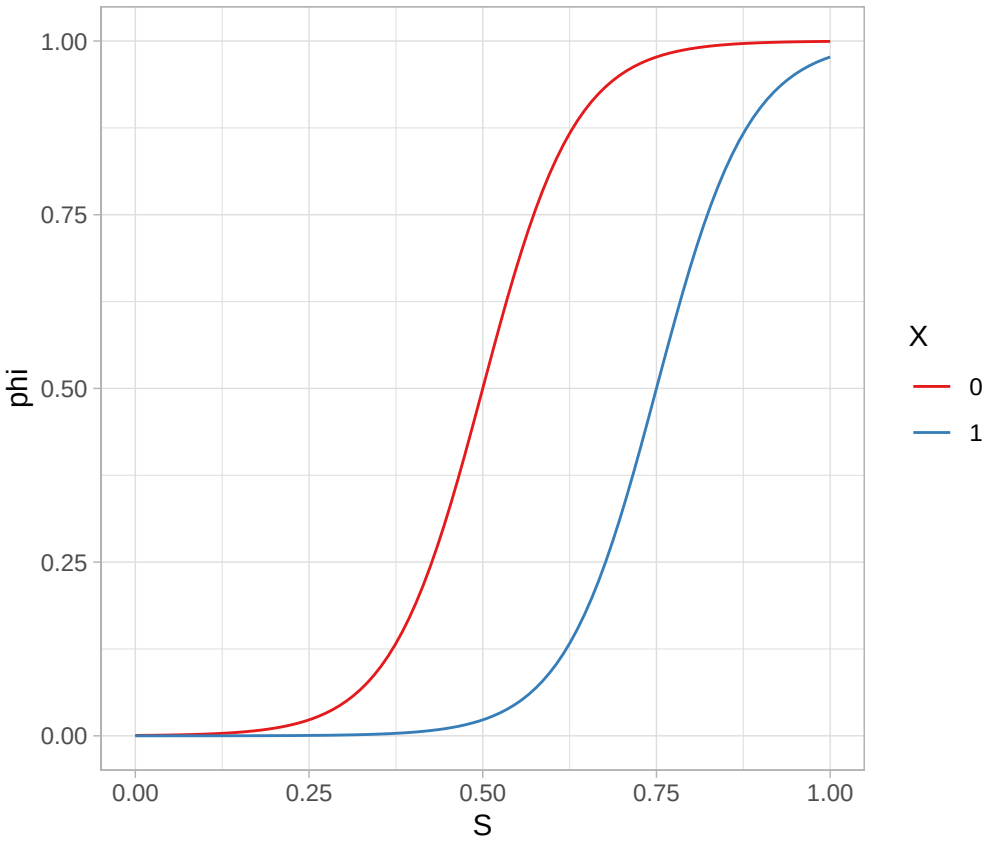



Note: Letting $\beta_0 = \beta_1 2$ fixes $\phi(0.5) = 0.5$

Now let's suppose we want $\phi()$ to be a function of $X_i$. We can let

$$\phi(S_i) = \frac{1}{1 + exp(-(\beta_0 + \beta_1 S_i + \beta_2 X_i))}$$

Now suppose that $\beta_2 = -5$


1.00
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