Solution for Exersize 4

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Abstract

Solution for Exersize 8b

1 Question 1b

Set $p(\overrightarrow{x}, \beta) = 0.5$ and take the $\beta^T = (-1.6, 5.1)$ that was calculated after 1000 iterations and x is $\overrightarrow{x}^T = (1, x)$

$p(\overrightarrow{x}, \beta) = \frac{exp(\beta^T \overrightarrow{x})}{1+exp(\beta^T \overrightarrow{x})}$
$0.5 = \frac{exp((-1.6,5.1)\overrightarrow{x})}{1+exp((-1.6,5.1)\overrightarrow{x})}$
$0.5 = \frac{exp(-1.6+5.1x)}{1+exp(-1.6+5.1x)}$
$\ln 0.5 = \ln \frac{exp(-1.6+5.1x)}{1+exp(-1.6+5.1x)}$
$\ln 0.5 = \ln exp(-1.6 + 5.1x) - \ln 1 + exp(-1.6 + 5.1x)$
$\ln 0.5 = -1.6 + 5.1x - \ln 1 + exp(-1.6 + 5.1x)$
$\underline{\underline{x = 0.313725}}$
Ab 0.31 mm Groesse der Sandkoerner ist es wahrscheinlicher Spinnen anzutreffen.