1 Single-parameter models

Bearing in mind

$$
\begin{aligned}
p(y) &= \int_0^1 \binom{n}{y} \theta^y (1-\theta)^{n-y} d\theta \\
&= \frac{1}{n+1}
\end{aligned}
\tag{1}
$$

and for the conditioanl $\mathbb{E}(\bullet)$,var$(\bullet)$

$$
\mathbb{E}(\theta) = \mathbb{E}(\mathbb{E}(\theta|y)) \tag{2}
$$

and

$$
var(\theta) = \mathbb{E}(var(\theta|y)) + var(\mathbb{E}(\theta|y)) \tag{3}
$$

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