

Paper Title

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1. Basic Probability Laws

These probability laws, such as the [Chain Rule](#) are fundamental. You can learn more about the link Chain Rule in [this video](#).

1.1. Chain Rule

For two events A and B , the **Chain Rule** states

$$\mathbb{P}(A \cap B) = \mathbb{P}(B \mid A)\mathbb{P}(A).$$

1.2. PSRL

The PSRL algorithm is shown in [Algorithm 1](#).

Algorithm 1: Posterior Sampling for Reinforcement Learning (PSRL)

```
1: Input: Prior  $P(\mathcal{M} \in \cdot)$ 
2: for  $k \in [K]$  do
3:   Sample  $M_k \sim \mathbb{P}(\mathcal{M} \in \cdot \mid H_k)$ 
4:   Obtain optimal policy  $\pi^k = \pi_{M_k}^*$ 
5:   Execute  $\pi^{\{(k)\}}$  and get trajectory  $\tau_k$ 
6:   Update history  $H_{\{k+1\}} = H_k \cup \tau_k$ 
7:   Induce posterior  $P(\mathcal{M} \in \cdot \mid H_{\{k+1\}})$ 
8: end for
```

Now, consider an application of the Chain Rule, mentioned in Section 1.1:

Green Box

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Orange Box

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