

# Mathematical background

$$v_{\pi}(s) = \sum_a \pi(a|s) \sum_{s',r} p(s',r|s,a) [r + \gamma v_{\pi}(s')], \quad \forall s \in S$$

Recursive relationship

Sum over  $s'$  and  $r$  pairs

Probability of getting  $s'$  and  $r$  given you are in state  $s$  and take action  $a$

The bulk of the mathematics of the course centers around summations over states and rewards, with probability distributions that utilize Bayesian notation (i.e.  $P(A|B)$ ). In many cases these equations are expressed recursively, to enable efficient computation.

If you can roughly parse the above equation, then you have the mathematical background necessary to learn the material

