DTU

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Beamer template

Colors

color	rgb	cmyk
dtured	0.6 0 0	0 0.6 0.6 0.4
white	1 1 1	0 0 0 0
black	0 0 0	0 0 0 1
blue	0.1843 0.2431 0.9176	0.7333 0.6745 0 0.0824
brightgreen	0.1216 0.8157 0.5098	0.6941 0 0.3059 0.1843
navyblue	0.0118 0.0588 0.3098	0.298 0.251 0 0.6902
yellow	0.9647 0.8157 0.3019	0 0.149 0.6628 0.0353
orange	0.9882 0.4627 0.2039	0 0.5255 0.7843 0.0118
pink	0.9686 0.7333 0.6941	0 0.2353 0.2745 0.0314
red	0.9098 0.2471 0.2824	0 0.6627 0.6274 0.0902
green	0 0.5333 0.2078	0.5333 0 0.3255 0.4667
purple	0.4745 0.1373 0.5569	0.0824 0.4196 0 0.4431

Graphs and figures

Item		
Animal	Description	Price($)
Gnat	per gram	13.65
	each	0.01
Gnu	stuffed	92.50
Emu	stuffed	33.33
Armadillo	frozen	8.99

Equations

The ideal gas law is shown in .

$$p \cdot V = n \cdot R \cdot T \tag{1}$$

$$\frac{\partial}{\partial t} \int_0^{\delta} U dy = -\delta \frac{1}{\rho} \frac{\partial P}{\partial x} - U_f(t)^2 \tag{2}$$

More equations

$$\begin{aligned} CH_3COOH + OH^- &\rightleftharpoons CH_3COO^- + H_2O \\ H_2O &\rightleftharpoons H^+_{(aq)} + OH^-_{(aq)} \end{aligned} \tag{3}$$

$$f(x) = 1 + x - 3x^2 \tag{4}$$

$$g(x) + y = 3x - \frac{1}{2}x^3 \tag{5}$$

Probability I

Law of total probability for random variables

Let X, Y be random variables where x, y represent possible values, it holds that:

$$P(x) = \sum_y P(x, y) = \sum_y P(x|y) \cdot P(y)$$

Probability II

Bayes' theorem

- For any two events A and B in the sample space S, where $\mathbb{P}(B) \neq 0$, it holds that
$$\mathbb{P}(A|B) = \frac{\mathbb{P}(P|A) \cdot \mathbb{P}(A)}{\mathbb{P}(B)}$$
- Let $A_1, A_2, \ldots, A_K$ be a *partition* of the sample space S. Using the *law of total probability* for $\mathbb{P}(B)$, it then holds that:
$$\mathbb{P}(A_j|B) = \frac{\mathbb{P}(B|A_j) \cdot (\mathbb{A})}{\sum_k \mathbb{P}(B|A_k) \cdot \mathbb{P}(A_k)}$$

Generalising problem-solving by searching

So far we have only considered search problems in environments that are:

- **Single agent.** There is a single agent acting, the one we control.
- **Static.** When the agent is not acting, the world doesn't change.
- **Deterministic.** Every action has a unique outcome.
- **Fully observable.** The full state description is accessible to the agent.

Problem solving in the real world rarely satisfies these assumptions.

Today, we will drop the assumption that the environment is deterministic and fully observable. We will also shortly consider generalising beyond single-agent and static environments.