Decision Rates Model

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1 Initiation/Navigation

1.1 Parameters

- Relative direction of patch i: Θ_i
- Value of patch i: v_i
- Max sensing distance: d_{sense}
- Mean resultant vector of individual relative to group: MRV

1.2 Derived Values

- Relative position in group: $p_{rel} = \dfrac{|MRV|}{d_{sense}}$
- Difference in direction to patch i and current group: $d_g = \dfrac{|\Theta_i - MRV|}{\pi}$
- K-value to initiate/navigate to patch i: $1 - p_{rel} \times d_g \times v_i$

2 Follow

2.1 Parameters

- Value of patch i: v_i
- Agent heading: Θ_h
- Patch i direction: Θ_i
- Max sensing distance: d_{sense}
- Distance to current group: d_c
- Distance to initiator's group: d_i

2.2 Derived Values

- Difference in heading and patch i direction: $\Theta_{diff} = 1 - \frac{|\Theta_h - \Theta_i|}{\pi}$
- Normalized difference in distance to current group and initiator's group: $d_{diff} = \frac{d_c - d_i}{d_{sense}}$
- K-value to follow group heading to patch i: $\Theta_{diff} \times d_{diff} \times v_i$

3 Forage

3.1 Parameters

- ToDo t: R_t

3.2 Derived Values

- ToDo t: $D_t = \frac{R_t}{A_p}$

4 Misc

- Two-dimensional Gaussian function: $f(x, y) = A \exp\left(- \left(\frac{(x - x_0)^2}{2\sigma_x^2} + \frac{(y - y_0)^2}{2\sigma_y^2} \right) \right)$

  `https://en.wikipedia.org/wiki/Gaussian_function#Two-dimensional_Gaussian_function`