Null Events

- This is a generalization of null events
- An event can be intrinsically null, e.g., it corresponds to a non-injective mapping
- Or can be "probabilistically" null, e.g., a rejected 'blue' event

- Total activity, in this system, is $k_r \cdot |\Phi_r| + k_b \cdot \frac{k_b}{k_r} \cdot |\Phi_b|$

  (where $\Phi_r$ is the set of mappings into $A(s=red)$ and $\Phi_b$ into $A(s=blue)$)

  i.e. $k_r \cdot |\Phi_r| + k_b \cdot |\Phi_b|$ as desired

- This can be used for ambiguous molecularity

  - $\text{red} = \text{uni-molecular}$
  - $\text{blue} = \text{bi-molecular}$

  but can be very inefficient

Ambiguos Molecularity

- If we can count the number of instances $A \neq A(s)$, $B(s)$ where $A$ and $B$ are connected, we can improve on the generic oversampling approach:

  - We know the actual activity of the system $k_r \cdot |\Phi_r| + k_b \cdot |\Phi_b|$

  - But selecting events uniformly at random will disfavor red (uni-) events and only favor the (bi-) events

  - Use a more complex event selection protocol:

    1. Select an event uniformly at random
    2. If 'red' go it
    3. Otherwise, accept the 'blue' event with probability $\frac{k_b}{k_r}$

    and start over [return to (i)] otherwise:

$$P(\text{red}) = \frac{k_r \cdot |\Phi_r|}{k_r \cdot |\Phi_r| + k_b \cdot |\Phi_b|}$$