## GROWTH & DIFFERENCES

*Saccharomyces uvarum* & *S. cerevisaie*

## LOGISTIC EQUATION

**difference equation (discrete)**

$N_{t+1} = r_{difference}\, N_t\, (K - N_t)$

**solution**

numerical analysis

**yogurt**

if unlimited, then oodles after one day, drops after two … !

$N_{t+1} = r_{difference}\, N_t\, (K - N_t)$; $N_0 = 0.5$, $K = 1$

plot N from t = 0 to 32 for

$r_{difference}$ =

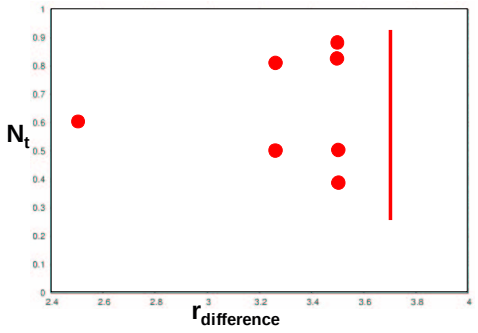
0

a number between 1 and 3

a number between 3 and 3.6

a number greater than 3.6

$r_{difference}$ =

| | |
|---|---|
| 0 | extinct |
| 1-3 | stable |
| > 3 | periodic |
| > 3.6 | chaotic |

## PHASE SPACE