Pick K random cluster centers, $\mu_1 \ldots \mu_k$

For t=1..T:

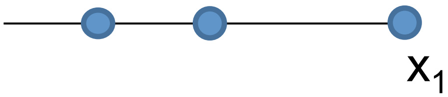
- E step:

$$p(y = i|x^j;\theta_t) \propto \exp\left(-\frac{1}{2\sigma^2}(x^j - \mu_i)^2\right)$$

- M step:

$$\mu_i = \frac{\sum_{j=1}^m p(y = i|x^j;\theta_t)x^j}{\sum_{j=1}^m p(y = i|x^j;\theta_t)}$$

x_1
-1
0
2



Initialization, random means and σ=1:

- μ_1=-1, μ_2=0

t=0:

- $P(y=1|x^1) \alpha \exp(-0.5\times(-1+1)^2) = 1$
- $P(y=2|x^1) \alpha \exp(-0.5\times(-1-0)^2) = 0.6$
    - $P(y=1|x^1) = 0.63$, $P(y=2|x^1)=0.37$
- $P(y=1|x^2) \alpha \exp(-0.5\times(0+1)^2) = 0.6$
- $P(y=2|x^2) \alpha \exp(-0.5\times(0-0)^2) = 1$
    - $P(y=1|x^2) = 0.37$, $P(y=2|x^2)=0.63$
- $P(y=1|x^3) \alpha \exp(-0.5\times(2+1)^2) = 0.07$
- $P(y=2|x^3) \alpha \exp(-0.5\times(2-0)^2) = 0.93$
    - $P(y=1|x^3) = 0.01$, $P(y=2|x^3)=0.93$
- $\mu^1 = (0.63\times-1 + 0.37\times0 + 0.07\times2) / (0.63 + 0.37 + 0.07) = -0.45$
- $\mu^2 = (0.37\times-1 + 0.67\times0 + 0.93\times2) / (0.37+0.67+0.93)=0.75$

t=1:

- learning continues, when do we stop?