P(z\_{i}^{(t)}=j) \propto p\_j^{(t-1)} \prod\_{k=1}^{d} \frac{1}{(\sigma\_{l\_{jk}}^{(t-1)}+\sigma\_{r\_{jk}}^{(t-1)})}

\times \left\{\begin{matrix}

\exp \begin{bmatrix}

-\frac{(X\_k-\mu\_{jk}^{(t-1)})^2}{2(\sigma\_{l\_{jk}}^{(t-1)})^2}

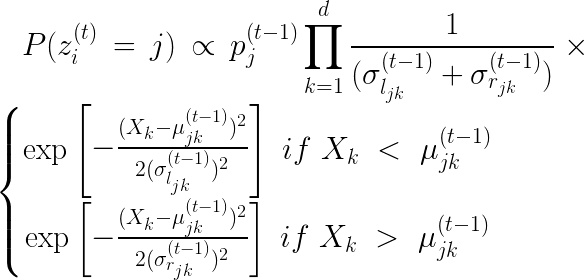
\end{bmatrix}\ if\ X\_k\ <\ \mu\_{jk}^{(t-1)} \\

\exp \begin{bmatrix}

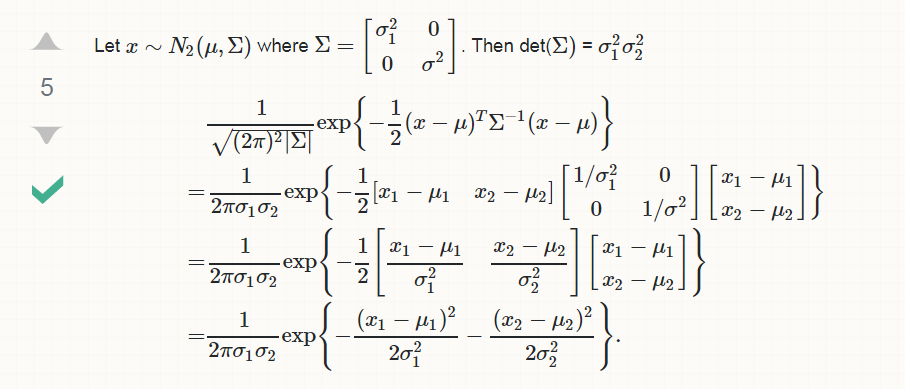
-\frac{(X\_k-\mu\_{jk}^{(t-1)})^2}{2(\sigma\_{r\_{jk}}^{(t-1)})^2}

\end{bmatrix}\ if\ X\_k\ >\ \mu\_{jk}^{(t-1)} \\

\end{matrix}\right.



1d to 2d Gaussian



\scalebox{.6}{$= \prod\_{i=i}^N \prod\_{j=1}^M\frac{P(X\_i|\mu\_j^{(t)},\sigma\_{lj}^{(t)},\sigma\_{rj}^{(t)})\textit{N}\_d(\mu\_j^{(t)}|\eta,\Sigma)\textit{N}\_d(\sigma\_{lj}^{(t)}|\tau,\Sigma)\textit{N}\_d(\sigma\_{rj}^{(t)}|\tau,\Sigma)\textit{N}\_d(\mu\_j^{(t-1)}|\mu\_j^{(t)},\Sigma)\textit{N}\_d(\sigma\_{lj}^{(t-1)}|\sigma\_{lj}^{(t)},\Sigma)\textit{N}\_d(\sigma\_{rj}^{(t-1)}|\sigma\_{rj}^{(t)},\Sigma)}

{P(X\_i|\mu\_j^{(t-1)},\sigma\_{lj}^{(t-1)},\sigma\_{rj}^{(t-1)})\textit{N}\_d(\mu\_j^{(t-1)}|\eta,\Sigma)\textit{N}\_d(\sigma\_{lj}^{(t-1)}|\tau,\Sigma)\textit{N}\_d(\sigma\_{rj}^{(t-1)}|\tau,\Sigma)\textit{N}\_d(\mu\_j^{(t)}|\mu\_j^{(t-1)},\Sigma)\textit{N}\_d(\sigma\_{lj}^{(t)}|\sigma\_{lj}^{(t-1)},\Sigma)\textit{N}\_d(\sigma\_{rj}^{(t)}|\sigma\_{rj}^{(t-1)},\Sigma)}$}