

Normalization to Avoid Underflow

	$p(w \theta_1)$	$p(w \theta_2)$	$p(w \bar{\theta})$
text	0.5	0.1	$(0.5+0.1)/2$
mining	0.2	0.1	$(0.2+0.1)/2$
medical	0.2	0.75	$(0.2+0.75)/2$
health	0.1	0.05	$(0.1+0.05)/2$

**Average of $p(w|\theta_i)$
as a possible normalizer**

$$p(Z_d = 1 | d) = \frac{p(\theta_1)p(\text{"text"}|\theta_1)^2 p(\text{"mining"}|\theta_1)^2}{p(\theta_1)p(\text{"text"}|\theta_1)^2 p(\text{"mining"}|\theta_1)^2 + \frac{p(\theta_2)p(\text{"text"}|\theta_2)^2 p(\text{"mining"}|\theta_2)^2}{p(\text{"text"}|\bar{\theta})^2 p(\text{"mining"}|\bar{\theta})^2}}$$