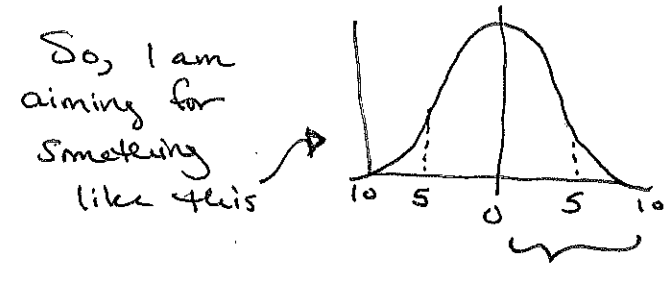
SHIFTING TP WORK

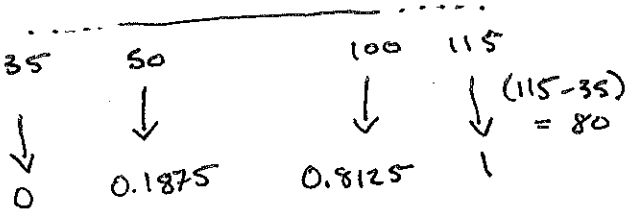
10. March. 2016

According to Lake et al. in press

Spring will advance across USA at about 6 d/decade w/ total variation (staying constant) at about ±10 d. (see Fig. 16).



Let's be a little conservative + say 5 days / decade then over 100 yrs, mean shifts from 100 to 50. So we need beta (β) to bracket 35 to 115. Each β step is then $\frac{1}{(115-35)} = 0.0125$



$\Rightarrow$ see code beta for tanp.R

So then I got to the two extreme histograms we wanted. But, then, how to go between them? eg. go from $\beta(51, 11)$ to $\beta(11, 51)$.

FROM Megan: For β distributions: $\mu = \frac{\alpha}{\alpha+\beta}$; $\text{var} = \frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$

We want to vary μ but hold var constant, so var = c

Re-write μ eqn as f(x) of μ: $\frac{\alpha}{\alpha+\beta} = \mu \Rightarrow \beta = \frac{\alpha(1-\mu)}{\mu}$

Now place into var eqn:

$$\frac{\alpha\left(\frac{\alpha(1-\mu)}{\mu}\right)}{\left(\alpha+\frac{\alpha(1-\mu)}{\mu}\right)^2\left(\alpha+\frac{\alpha(1-\mu)}{\mu}+1\right)} = c$$

now we just need to solve for α given we know c, our shifting μ (+ it helps that we know when $\alpha=\beta$, $\mu = 0.5$) ....