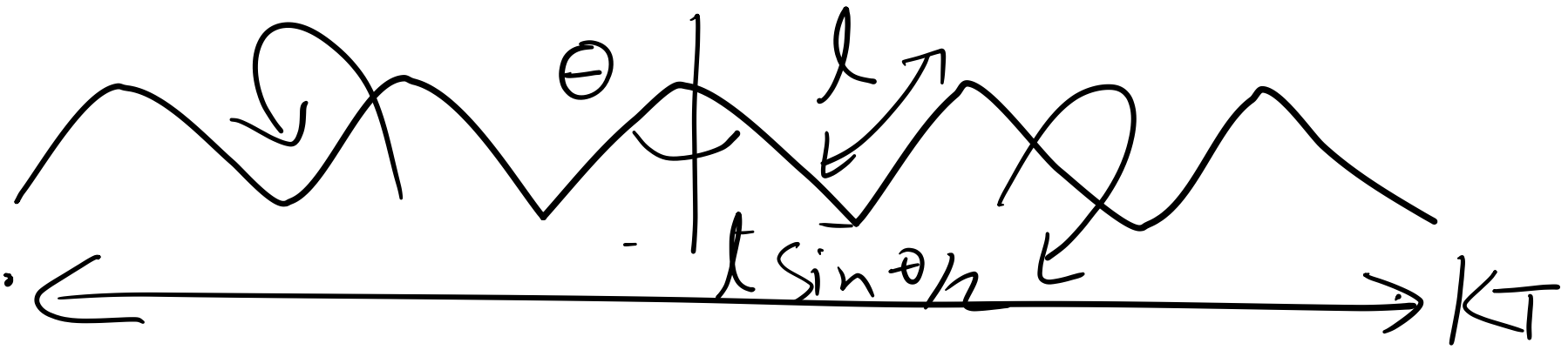
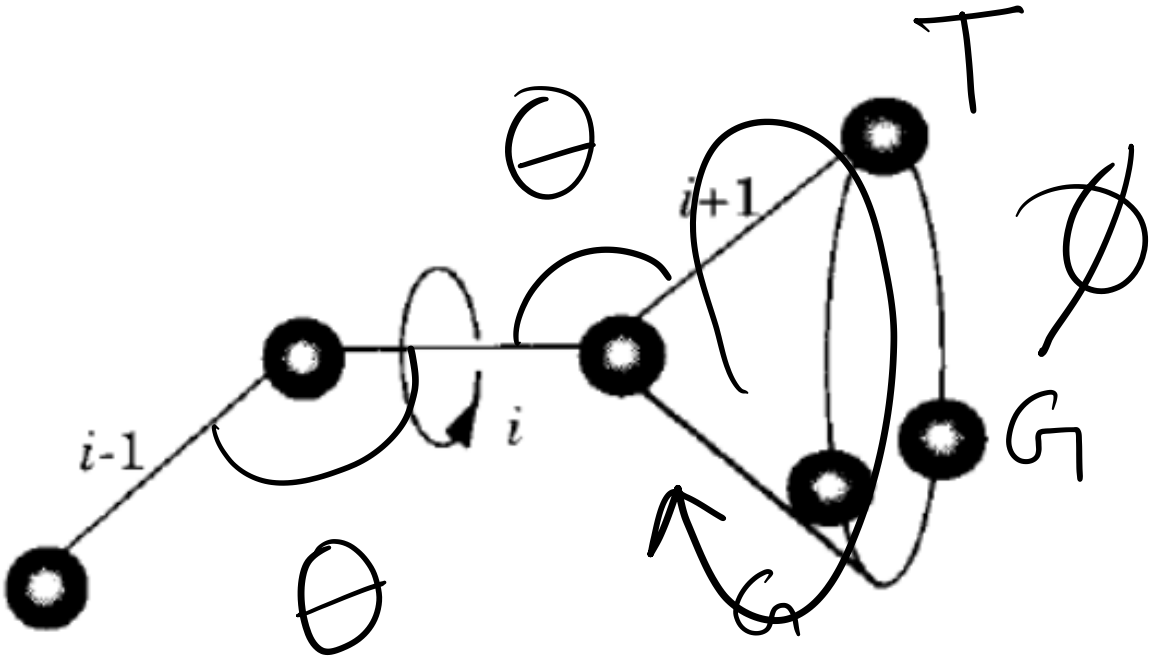
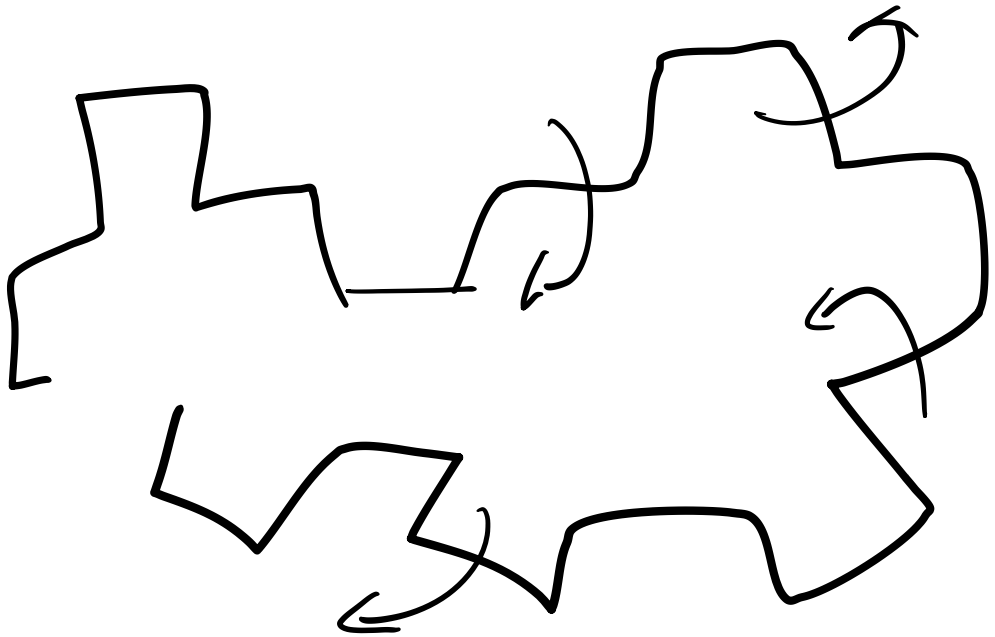
TXL211
Lecture 4

CONTOUR LENGTH = nl



ALL TRANS $= nl \sin\frac{\theta}{2}$


i-1
i
i+1

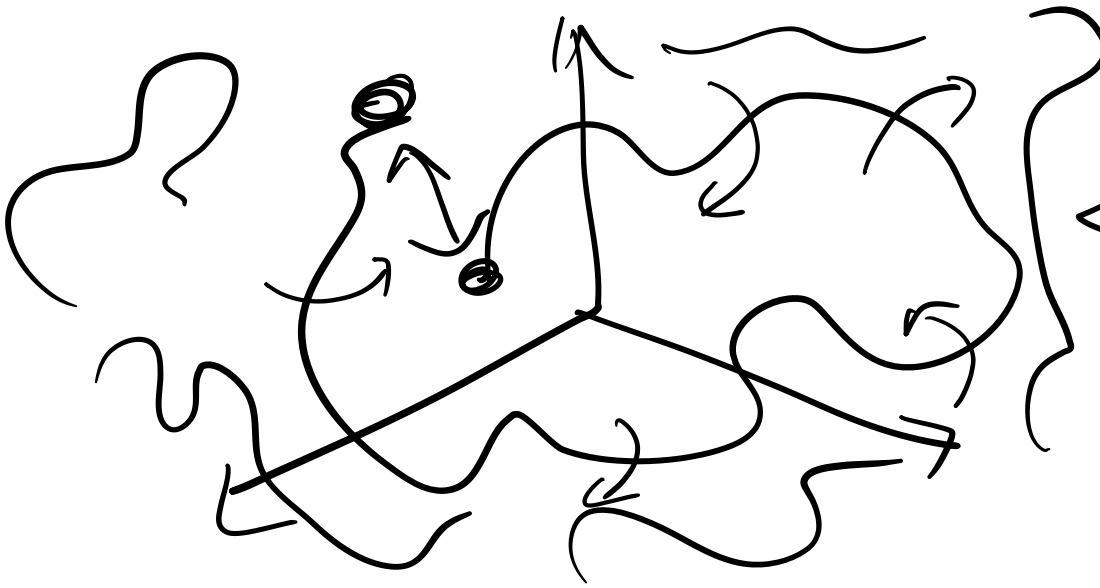


RANDOM COIL

CHAIN END-TO-END DISTANCE

END-TO-END DISTANCE

RMS



$\langle \bar{r}^2 \rangle^{1/2}$

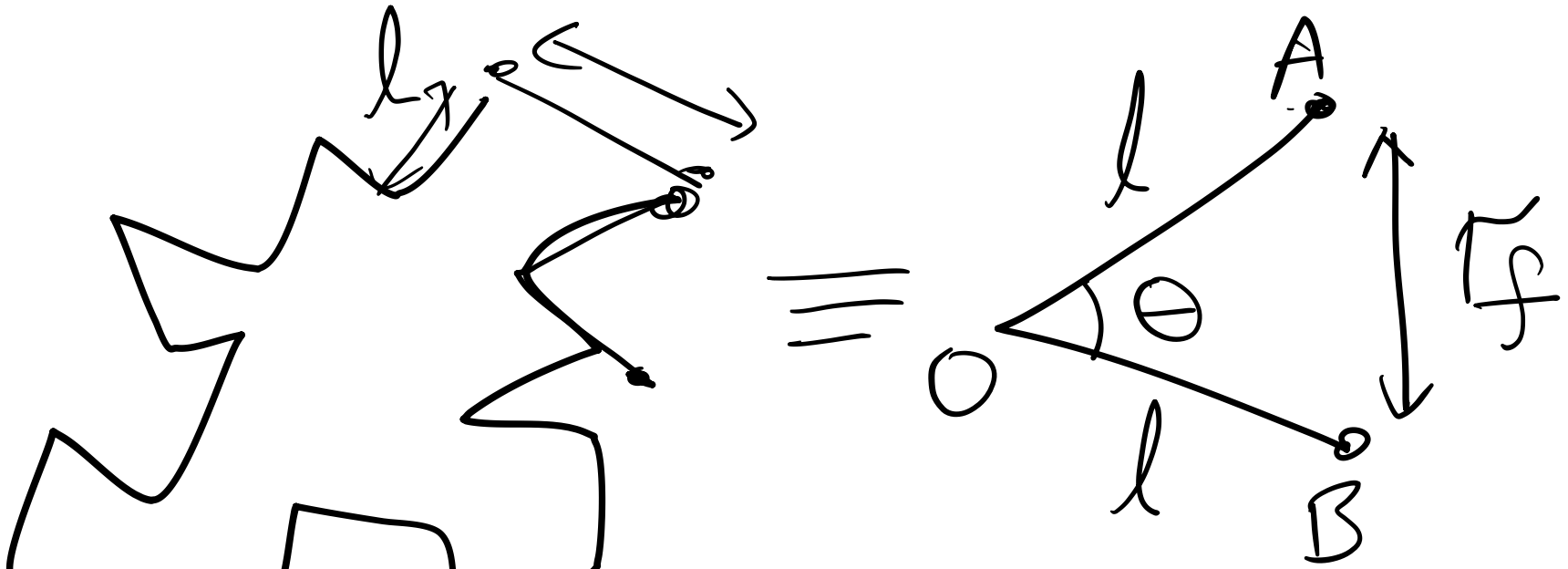
RADIUS OF GYRATION

$\langle \bar{s}^2 \rangle^{1/2}$

$$\langle \bar{r}^2 \rangle^{1/2} = \langle 6\bar{s}^2 \rangle^{1/2}$$

$$\langle \bar{s}^2 \rangle^{1/2} = \frac{\langle \bar{r}^2 \rangle^{1/2}}{\sqrt{6}}$$

FREELY-JOINTED CHAIN

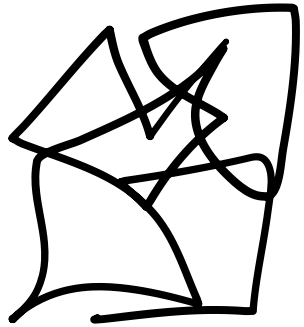


$$AB^2 = OA^2 + OB^2 - 2(OA)(OB)\cos\theta$$

RANDOM WALK

$$r_f^2 = 2l^2 - 2l^2\cos\theta$$

$$r_f^2 = 2l^2 - 2l^2 \cos\theta$$



$\Downarrow$

n bonds

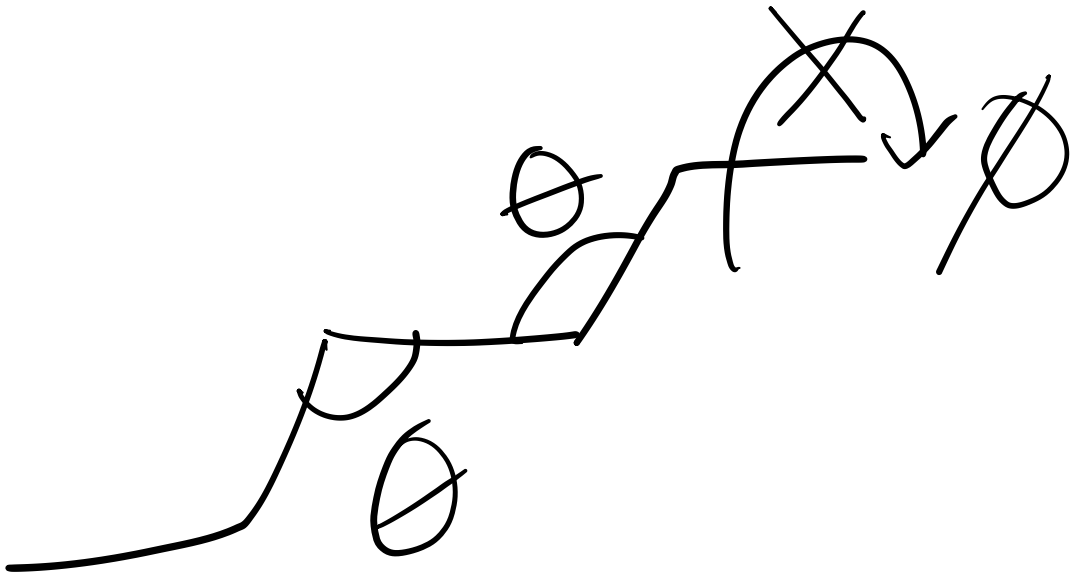
$$r_f^2 = nl^2$$

$$\langle r_f^2 \rangle^{1/2} = \sqrt{n}\, l$$

VALENCE ANGLE MODEL

$109.5° = \theta$

$$\langle \vec{r}_{fa}^{\,2} \rangle = nl^2 \frac{1-\cos\theta}{1+\cos\theta}$$



HINDERED ROTATIONS

$$\langle \bar{r}_{ha}^2 \rangle = nl^2 \left(\frac{1-\cos\theta}{1+\cos\theta}\right)\left(\frac{1+\overline{\cos\phi}}{1-\overline{\cos\phi}}\right)$$

$$\Downarrow$$

$$\times$$

$$\langle \bar{r}_0^2 \rangle = \sigma^2 nl^2 \left(\frac{1-\cos\theta}{1+\cos\theta}\right)$$

$$\Vert$$

STERIC PARAMETER

$$\sigma = \frac{\langle \bar{r}_0^2 \rangle^{1/2}}{\langle \bar{r}_{fa}^2 \rangle^{1/2}}$$

CHARACTERISTIC RATIO

$$C_\infty = \frac{\langle \bar{r}_0^2 \rangle}{\langle \bar{r}_f^2 \rangle}$$

$$\langle r^2 \rangle_f^{1/2} = n^{1/2} l$$

$$\langle S^2 \rangle^{1/2} = \frac{\langle r^2 \rangle^{1/2}}{\sqrt{6}}$$

$$\langle r^2 \rangle_{fa} = nl^2 \left(\frac{1 - \cos\theta}{1 + \cos\theta} \right)$$

$$\langle r^2 \rangle_{ha} = nl^2 \left(\frac{1 - \cos\theta}{1 + \cos\theta} \right) \left(\frac{1 + \overline{\cos\phi}}{1 - \overline{\cos\phi}} \right)$$

$$\langle r^2 \rangle_0 = \sigma^2 nl^2 \left(\frac{1 - \cos\theta}{1 + \cos\theta} \right)$$

$$C_\infty = \langle r^2 \rangle_0 / nl^2$$

$$\langle r^2 \rangle^{1/2} = \alpha \langle r^2 \rangle_0^{1/2}$$