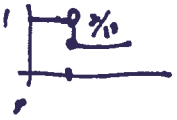
Hand-Calculation Example for KM-Estimates

$2.2.3^{+}, 5.5^{+}, 2.9.16.16.18^{+}$

$2.5.7.9.16.$

$i=1 \quad i=2 \quad 3 \quad 4 \quad 5 \quad \dots n$

$i=1 \quad \hat{S}_{KM}(t_{(1)}) = \left(1-\frac{2}{10}\right) = \frac{8}{10} = \frac{56}{70}$ drop. 2/10. $= P_1$ $\quad n_1 = 10$



$i=2 \quad \hat{S}_{KM}(t_{(2)}) = \left(1-\frac{2}{10}\right)\left(1-\frac{1}{7}\right)$ dropped $\frac{14}{70}$

$= \frac{8}{10}\,\frac{6}{7} = \frac{48}{70}$

$\hat{S}_{KM}(t) = \prod_{x_j \le t} \left(1-\frac{d_j}{m_j}\right)$ $\quad m_j =$ "obs surv up to x_j : at Risk at x_j"

$d_j =$ # deaths.

All pnb before t "16" $= \frac{8}{10} + \frac{8}{70} + \frac{48}{350} + \frac{192}{1400} + \frac{1152}{4200}$

$t=2 \quad \hat{S}_{KM}(2) = \left(1-\frac{2}{10}\right) = \frac{8}{10} = \frac{56}{70}$ $\quad \hat{P}_{2} = \frac{2}{10} = 0.2$

No $t=3$ only censored data.

$t=5 \quad \hat{S}_{KM}(5) = \left(1-\frac{2}{10}\right)\times\left(1-\frac{1}{7}\right) = \frac{8}{10}\times\frac{6}{7} = \frac{48}{70}$ $\quad \hat{P}_{5} = \frac{8}{70} = 0.114$

$\frac{1}{8}$ $\quad \frac{240}{350} = .891$

$t=7 \quad \hat{S}_{KM}(7) = \frac{8}{10}\times\frac{6}{7}\times\left(1-\frac{1}{5}\right) = \frac{48}{70}\times\frac{4}{5} = \frac{192}{350}$ $\quad \hat{P}_{7} = \frac{48}{350} = 0.137143$

$\frac{240}{192}$ $\quad \frac{192}{48}$

$t=9 \quad \hat{S}_{KM}(9) = \frac{192}{350}\times\left(1-\frac{1}{4}\right) = \frac{192}{350}\times\frac{3}{4}$

$\frac{268}{350\times4} = \frac{192\times4}{350\times4}$ $\quad = \frac{576}{1400}$ $\quad \frac{192}{1400} = 0.137143$

$\frac{268}{576}$ $\quad \frac{576}{192}$

$t=16 \quad \hat{S}_{KM}(16) = \frac{576}{1400}\times\left(1-\frac{2}{3}\right) = \frac{576}{4200}$ $\quad \frac{1152}{4200} = 0.274286$

$\frac{1728}{576}$ $\quad \frac{576}{1152}$