

Load vector  $\underline{r}$  with  $r_i = b(\varphi_i)$

Split contributions to vector  $\underline{r}$

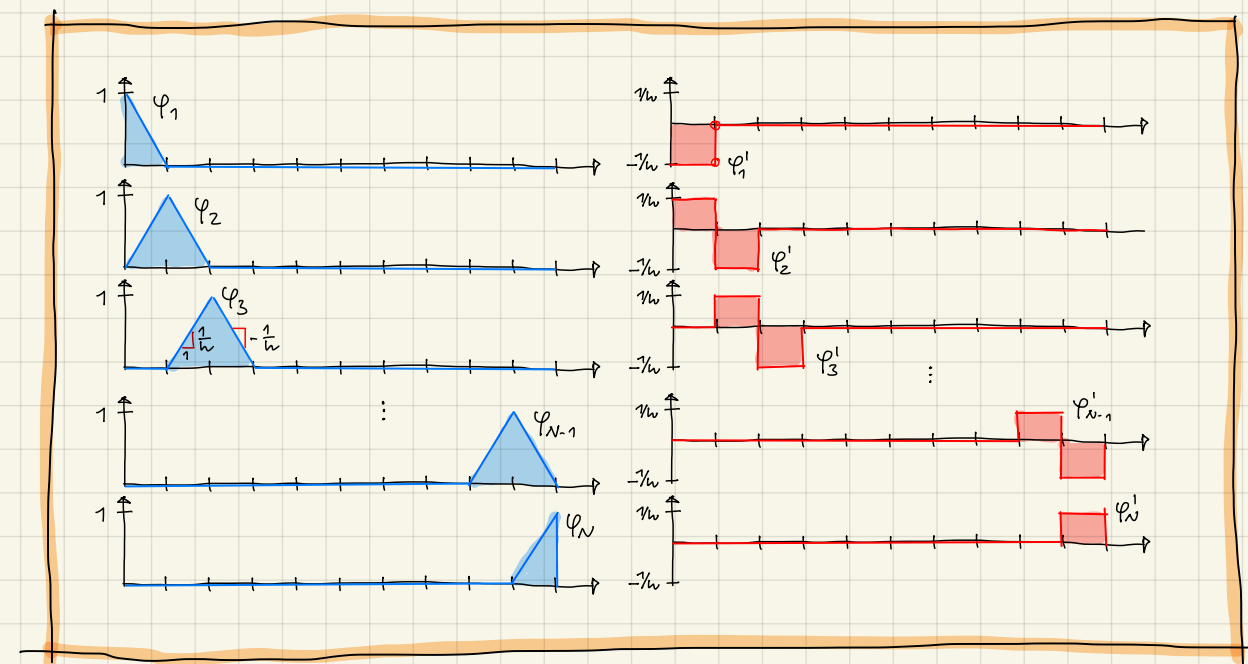
$$r_i = b(\varphi_i) = \underbrace{n \cdot \int_0^L \varphi_i dx}_{r_i^u} + \underbrace{F \cdot \varphi_i(0)}_{r_i^F}$$

Therefore

$$\underline{r}^u = \frac{n \cdot h}{2} \begin{bmatrix} 1 \\ 2 \\ 2 \\ \vdots \\ 2 \\ 1 \end{bmatrix}$$

$$\underline{r}^F = \begin{bmatrix} F \\ 0 \\ 0 \\ \vdots \\ 0 \\ 0 \end{bmatrix}$$

$$\underline{r} = \underline{r}^u + \underline{r}^F$$



$$\int_0^L \varphi_1 dx = \int_0^L \varphi_N dx = \frac{h}{2}$$

$$\int_0^L \varphi_i dx = \frac{2 \cdot h}{2} = h, \quad i=2, \dots, N-1$$

$$\varphi_i(0) = \begin{cases} 1 & \text{if } i=1 \\ 0 & \text{otherwise} \end{cases}$$