Algorithm 1: Richardson's method

$$egin{aligned} x_0 & ext{ given} \ r_0 &= b - A \, x_0 \ k &= 0 \ & ext{repeat} \ & egin{aligned} p_k &= r_k \ lpha_k &= au \ x_{k+1} &= x_k + lpha_k \, p_k \ r_{k+1} &= r_k - lpha_k \, A p_k \ k &= k+1 \ \end{aligned} egin{aligned} b &= b - A \, x_{k+1} \ k &= k+1 \ \end{aligned} egin{aligned} ext{until stopping criterion fulfilled, e.g. } \|r_k\|_{\ell^2} \leq arepsilon \, \|r_0\|_{\ell^2} \end{aligned}$$

Algorithm 2: Method of steepest descent

```
egin{aligned} x_0 & 	ext{ given} \ r_0 &= b - A \, x_0 \ k &= 0 \ & 	ext{repeat} \ egin{aligned} & oldsymbol{p_k} &= oldsymbol{r_k} \ & lpha_k &= rac{(r_k, p_k)}{(p_k, A p_k)} \ & x_{k+1} &= x_k + lpha_k \, p_k \ & r_{k+1} &= r_k - lpha_k \, A p_k \ & k &= k+1 \ \end{pmatrix} & = b - A \, x_{k+1} \ & k &= k+1 \ & 	ext{until stopping criterion fulfilled, e.g. } \|oldsymbol{r_k}\|_{\ell^2} \leq arepsilon \|oldsymbol{r_0}\|_{\ell^2} \end{aligned}
```

Algorithm 3: Conjugate gradient method

```
egin{align*} x_0 & 	ext{given} \ r_0 &= b - A \, x_0 \ k &= 0 \ \end{array} repeat \mid 	ext{ if } k = 0 	ext{ then} \ \mid 	ext{ } p_k = r_k \ \end{aligned} else \mid 	ext{ } eta_{k-1} = -rac{(r_k, Ap_{k-1})}{(p_{k-1}, Ap_{k-1})} \ \mid 	ext{ } p_k = r_k + eta_{k-1} \, p_{k-1} \ \end{aligned} end \mid 	ext{ } lpha_k = rac{(r_k, p_k)}{(p_k, Ap_k)} \ \mid 	ext{ } x_{k+1} = x_k + lpha_k \, p_k \ \mid 	ext{ } r_{k+1} = r_k - lpha_k \, Ap_k \quad = b - A \, x_{k+1} \ \mid 	ext{ } k = k+1 \ \end{aligned} until stopping criterion fulfilled, e.g. ||r_k||_{\ell^2} \leq arepsilon ||r_0||_{\ell^2}
```