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**Real Linear Iterations**

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Any linear system

$$Ax = b, \tag{1}$$

with  $A \in \mathbf{R}^{n \times n}$  and  $b \in \mathbf{R}^n$ , can be rewritten as an equivalent complex real linear system

$$Mz + N\bar{z} = c, \tag{2}$$

of halved size, i.e., we have  $M, N \in \mathbf{C}^{\frac{n}{2} \times \frac{n}{2}}$  and  $c \in \mathbf{C}^{\frac{n}{2}}$ .

We give examples of applications where this latter formulation (2) arises. We introduce methods to solve the system directly and iteratively. We discuss preconditioning ideas for the formulation (2).