The OSEEN problem in variational formulation:

(23)
$$\boxed{\begin{array}{l} \text{Find } u \in V \text{ and } p \in Q: \\ a(w;u,v) + b(v,p) = \langle F, v \rangle \quad \forall v \in V, \\ b(u,q) \qquad\qquad\qquad\; = 0 \qquad\quad\; \forall q \in Q. \end{array}}$$

For given $\overset{\overset{V}{\downarrow}}{w}$, set $a(u,v) := a(w;u,v)$.
Then (23) exactly has the form (21),
where the bilinear form $a(\cdot,\cdot)$ is here non-symmetric!

The STOKES problem:

For small Reynolds numbers (viscous flow), the (non-symmetric) convection term can be neglected. Thus, we obtain the VF:

(24)
$$\boxed{\begin{array}{l} \text{Find } u \in V \text{ and } p \in Q: \\ a(u,v) + b(v,p) = \langle F, v \rangle \quad \forall v \in V \\ b(u,q) \qquad\qquad\quad = 0 \qquad\qquad \forall q \in Q \end{array}}$$

with the symmetric bilinear form
$$a(u,v) := \frac{1}{Re} \int_\Omega \nabla^T u \cdot \nabla v \, dx.$$

In the Lect. "CM", the existence and uniqueness of the solution $(u,p) \in V \times Q$ will be shown, i.e. the pressure p is unique only up to an additive constant, and the FE discretization will be discussed.

$\downarrow$

$V_h \subset V$, $Q_h \subset V$ $\curvearrowright$ mixed FEM

discrete LBB condition!