$$a_0(p,q) - \int\limits_{\Gamma_\mathrm{I}} \left\{\frac{\partial p}{\partial n}\right\} \left([\![q]\!] + \alpha \left\{\frac{\partial q}{\partial n}\right\}\right) + \int\limits_{\Gamma_\mathrm{I}} \beta \left([\![p]\!] + \alpha \left\{\frac{\partial p}{\partial n}\right\}\right) \left([\![q]\!] + \alpha \left\{\frac{\partial q}{\partial n}\right\}\right) = \ell(q), \tag{1}$$

where $[\![p]\!]$ and $\{\partial q/\partial n\}$ are acoustic pressure jump and average normal acoustic flux, respectively, α and β are complex constants with

$$a_0(p,q) = \int\limits_{\Omega_0} \nabla p \cdot \nabla q - \kappa^2 \int\limits_{\Omega_0} pq + \mathrm{i}\kappa \int\limits_{\Gamma_\mathrm{io}} pq. \tag{2}$$

where $\Omega_0 \subset \mathbb{R}^2$ is a union of different open disjoint subdomain, Γ_io is inlet-outlet boundary, and Γ_I a union of interface boundaries.