1. α_{R} for different types of equations

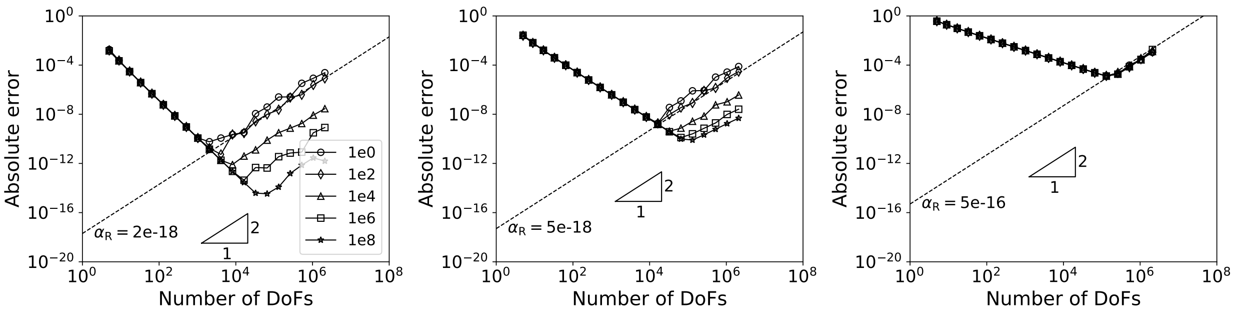
We consider the benchmark Poisson equation, i.e. $u = e^{-(x-1/2)^2}$, but we extend it to diffusion and Helmholtz equations by choosing different $d(x)$ and $r(x)$, see Table 1 for the settings. The variables in $d(x)$ and $r(x)$ are denoted as c_d and c_h, respectively, for which the values of the former ranges from 1 to 10^4, and that of the latter is equal to 1.

Table 1 Settings of the Poisson, diffusion and Helmholtz equations.

	"Poisson"	"diffusion"	"Helmholtz"
$d(x)$	1	$1 + 0.5\sin(c_d x)$	$1 + 0.5\sin(x)$
$r(x)$	0	0	c_h

The offset α_{R} for the three types of equations using the standard FEM (P_2 elements) and the mixed FEM (P_4/P_3^{disc} elements) are shown in 2 writing 1 1d summary of offsets.

It shows that the offset α_{R} is generally not affected by the types of equations considered. However, if we increase c_h for the Helmholtz equation, α_{R} for the solution and first derivative would decrease, see Fig. 1.



(a) Solution **(b)** First derivative **(c)** Second derivative

Fig. 1. Absolute errors for the Helmholtz equation using the standard FEM for different c_h.