

## CREATING DOMAIN MAPPINGS\*

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**Abstract.** Consider being given a mapping  $\varphi : S^{d-1} \xrightarrow[\text{onto}]{1-1} \partial\Omega$ , with  $\partial\Omega$  the  $(d-1)$ -dimensional smooth boundary surface for a bounded open simply-connected region  $\Omega$  in  $\mathbb{R}^d$ ,  $d \geq 2$ . We consider the problem of constructing an extension  $\Phi : \overline{B_d} \xrightarrow[\text{onto}]{1-1} \overline{\Omega}$  with  $B_d$  the open unit ball in  $\mathbb{R}^d$ . The mapping is also required to be continuously differentiable with a non-singular Jacobian matrix at all points. We discuss ways of obtaining initial guesses for such a mapping  $\Phi$  and of then improving it by an iteration method.

**Key words.** domain mapping, multivariate polynomial, constrained minimization, nonlinear iteration

**AMS subject classifications.** 65D99

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