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## **The isoperimetric type inequalities and nonlinear PDEs**

We discuss Alexandrov-Fenchel type isoperimetric inequalities and their relationship with elliptic and parabolic-type partial differential equations. We give a proof of the isoperimetric inequality for quermass integrals of nonconvex starshaped domains, using an expanding geometric curvature flow. We also prove a similar type of inequalities for functions on  $\mathbb{S}^n$  using elliptic Hessian equation.