Tabela 2-2 Relações de transformação de coordenadas

Transformação	Variáveis do sistema de coordenadas	Vetores unitários	Componentes dos vetores
De cartesiana para cilíndrica	$r = \sqrt[+]{x^2 + y^2}$ $\phi = \text{tg}^{-1}(y/x)$ $z = z$	$\hat{\mathbf{r}} = \hat{\mathbf{x}} \cos\phi + \hat{\mathbf{y}} \operatorname{sen}\phi$ $\hat{\boldsymbol{\phi}} = -\hat{\mathbf{x}} \operatorname{sen}\phi + \hat{\mathbf{y}} \cos\phi$ $\hat{\mathbf{z}} = \hat{\mathbf{z}}$	$A_r = A_x \cos\phi + A_y \operatorname{sen}\phi$ $A_\phi = -A_x \operatorname{sen}\phi + A_y \cos\phi$ $A_z = A_z$
De cilíndrica para cartesiana	$x = r \cos\phi$ $y = r \operatorname{sen}\phi$ $z = z$	$\hat{\mathbf{x}} = \hat{\mathbf{r}} \cos\phi - \hat{\boldsymbol{\phi}} \operatorname{sen}\phi$ $\hat{\mathbf{y}} = \hat{\mathbf{r}} \operatorname{sen}\phi + \hat{\boldsymbol{\phi}} \cos\phi$ $\hat{\mathbf{z}} = \hat{\mathbf{z}}$	$A_x = A_r \cos\phi - A_\phi \operatorname{sen}\phi$ $A_y = A_r \operatorname{sen}\phi + A_\phi \cos\phi$ $A_z = A_z$
De cartesiana para esférica	$R = \sqrt[+]{x^2 + y^2 + z^2}$ $\theta = \text{tg}^{-1}[\sqrt[+]{x^2 + y^2}/z]$ $\phi = \text{tg}^{-1}(y/x)$	$\hat{\mathbf{R}} = \hat{\mathbf{x}} \operatorname{sen}\theta \cos\phi$ $\quad + \hat{\mathbf{y}} \operatorname{sen}\theta \operatorname{sen}\phi + \hat{\mathbf{z}} \cos\theta$ $\hat{\boldsymbol{\theta}} = \hat{\mathbf{x}} \cos\theta \cos\phi$ $\quad + \hat{\mathbf{y}} \cos\theta \operatorname{sen}\phi - \hat{\mathbf{z}} \operatorname{sen}\theta$ $\hat{\boldsymbol{\phi}} = -\hat{\mathbf{x}} \operatorname{sen}\phi + \hat{\mathbf{y}} \cos\phi$	$A_R = A_x \operatorname{sen}\theta \cos\phi$ $\quad + A_y \operatorname{sen}\theta \operatorname{sen}\phi + A_z \cos\theta$ $A_\theta = A_x \cos\theta \cos\phi$ $\quad + A_y \cos\theta \operatorname{sen}\phi - A_z \operatorname{sen}\theta$ $A_\phi = -A_x \operatorname{sen}\phi + A_y \cos\phi$
De esférica para cartesiana	$x = R \operatorname{sen}\theta \cos\phi$ $y = R \operatorname{sen}\theta \operatorname{sen}\phi$ $z = R \cos\theta$	$\hat{\mathbf{x}} = \hat{\mathbf{R}} \operatorname{sen}\theta \cos\phi$ $\quad + \hat{\boldsymbol{\theta}} \cos\theta \cos\phi - \hat{\boldsymbol{\phi}} \operatorname{sen}\phi$ $\hat{\mathbf{y}} = \hat{\mathbf{R}} \operatorname{sen}\theta \operatorname{sen}\phi$ $\quad + \hat{\boldsymbol{\theta}} \cos\theta \operatorname{sen}\phi + \hat{\boldsymbol{\phi}} \cos\phi$ $\hat{\mathbf{z}} = \hat{\mathbf{R}} \cos\theta - \hat{\boldsymbol{\theta}} \operatorname{sen}\theta$	$A_x = A_R \operatorname{sen}\theta \cos\phi$ $\quad + A_\theta \cos\theta \cos\phi - A_\phi \operatorname{sen}\phi$ $A_y = A_R \operatorname{sen}\theta \operatorname{sen}\phi$ $\quad + A_\theta \cos\theta \operatorname{sen}\phi + A_\phi \cos\phi$ $A_z = A_R \cos\theta - A_\theta \operatorname{sen}\theta$
De cilíndrica para esférica	$R = \sqrt[+]{r^2 + z^2}$ $\theta = \text{tg}^{-1}(r/z)$ $\phi = \phi$	$\hat{\mathbf{R}} = \hat{\mathbf{r}} \operatorname{sen}\theta + \hat{\mathbf{z}} \cos\theta$ $\hat{\boldsymbol{\theta}} = \hat{\mathbf{r}} \cos\theta - \hat{\mathbf{z}} \operatorname{sen}\theta$ $\hat{\boldsymbol{\phi}} = \hat{\boldsymbol{\phi}}$	$A_R = A_r \operatorname{sen}\theta + A_z \cos\theta$ $A_\theta = A_r \cos\theta - A_z \operatorname{sen}\theta$ $A_\phi = A_\phi$
De esférica para cilíndrica	$r = R \operatorname{sen}\theta$ $\phi = \phi$ $z = R \cos\theta$	$\hat{\mathbf{r}} = \hat{\mathbf{R}} \operatorname{sen}\theta + \hat{\boldsymbol{\theta}} \cos\theta$ $\hat{\boldsymbol{\phi}} = \hat{\boldsymbol{\phi}}$ $\hat{\mathbf{z}} = \hat{\mathbf{R}} \cos\theta - \hat{\boldsymbol{\theta}} \operatorname{sen}\theta$	$A_r = A_R \operatorname{sen}\theta + A_\theta \cos\theta$ $A_\phi = A_\phi$ $A_z = A_R \cos\theta - A_\theta \operatorname{sen}\theta$