TUGAS

3 Evaluate both sides of Stokes' theorem for the field $\mathbf{G} = 10\sin\theta\mathbf{a}_\phi$ and the surface $r = 3$, $0 \le \theta \le 90^\circ$, $0 \le \phi \le 90^\circ$. Let the surface have the $\mathbf{a}_r$ direction.

4 Given the field $\mathbf{H} = \frac{1}{2}\cos\frac{\phi}{2}\mathbf{a}_\rho - \sin\frac{\phi}{2}\mathbf{a}_\phi$ A/m, evaluate both sides of Stokes' theorem for the path formed by the intersection of the cylinder $\rho = 3$ and the plane $z = 2$, and for the surface defined by $\rho = 3$, $0 \le z \le 2$, and $z = 0$, $0 \le \rho \le 3$.

5 Given $\mathbf{H} = (3r^2/\sin\theta)\mathbf{a}_\theta + 54r\cos\theta\mathbf{a}_\phi$ A/m in free space: (*a*) find the total current in the $\mathbf{A}_\theta$ direction through the conical surface $\theta = 20^\circ$, $0 \le \phi \le 2\pi$, $0 \le r \le 5$, by whichever side of Stokes' theorem you like the best. (*b*) Check the result by using the other side of Stokes' theorem.