Progressive Education Society's
Modern College of Arts, Science and Commerce (Autonomous),
Shivajinagar, Pune - 5

Department Of Mathematics
SYBSC (Semester IV) 19ScMatU403

Based on Vector Calculus

Subject : Mathematics Practical-IV (19ScMatU403)
Practical Incharge: Rima Ahuja

Practical 6:Gauss Divergence Theorem

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1. Verify Divergence theorem for $\bar{f} = 4xz\hat{i} - y^2z\hat{j} + yz\hat{k}$ and 's' surface of cube bounded by planes $x = 0$, $x = 1$,$y = 0$, $y = 1$, $z = 0$, $z = 1$.
2. Verify Divergence theorem for $\bar{f} = x\hat{i} - y\hat{j} + (z^2 - 1)\hat{k}$ and 's' is closed surface bounded by planes $z = 0$, $z = 1$ and cylinder $x^2 + y^2 = 4$.
3. Using Divergence theorem evaluate $\iint_S \bar{f}.\bar{n}\ ds$ where $\bar{f} = a(x+y)\hat{i} + 4(y-x)\hat{j} + z^2\hat{k}$ and 's' is hemisphere $x^2 + y^2 + z^2 = a^2$, $z \geq 0$
4. Apply Divergence theorem to evaluate $\iint_S (x^3 - yz)\ dy\ dz - 2x^2y\ dz\ dx + z\ dx\ dy$ over the surface of cube bounded by coordinate planes and planes $x = a$, $y = a$, $z = a$.
5. If v denoted volume of a region bounded by closed surface s and $\bar{f} = x\hat{i} + y\hat{j} + 3z\hat{k}$. Show that $\iint_S \bar{f}.\bar{n}\ ds = 6v$