

Line Integrals

Calculate the work done for

- The force $\mathbf{F} = x^2\mathbf{i} + yz\mathbf{j}$ from the point (1,2,3) to the point (4,5,6) along the straight lines which also go through the intermediary points (1,2,6) and (1,5,6).
 - From (1,2,3) to (1,2,6) $W_1 = 0$
 - From (1,2,6) to (1,5,6) $W_2 = 63$
 - From (1,5,6) to (4,5,6) $W_3 = 21$
 - $W = W_1 + W_2 + W_3 = 84$ J
- The force $\mathbf{F} = x^2\mathbf{i} + yz\mathbf{j}$ from the point (1,2,3) to the point (4,5,6) along the straight line between them. **70.5 J**
- The force $\mathbf{F} = 3x^2\mathbf{i}$ along one half of the cardioid $r = 6(1+\cos\phi)$ for $0 \leq \phi \leq \pi$. **-1728 J (Using Maple to evaluate long integral)**

