

6. $\frac{d}{dt} \int_{\partial V} \mathbf{v} \cdot d\mathbf{A} = \int_V \nabla \cdot \mathbf{v} dV$ (Gauss's theorem for vector fields)

7. $\frac{d}{dt} \int_V \rho dV = \int_V \frac{d\rho}{dt} dV + \int_{\partial V} \rho \mathbf{v} \cdot d\mathbf{A}$ (Continuity equation)

8. $\frac{d}{dt} \int_V \rho \mathbf{r} dV = \int_V \rho \mathbf{r} \frac{d}{dt} dV + \int_{\partial V} \rho \mathbf{r} \mathbf{v} \cdot d\mathbf{A}$ (Angular momentum conservation)

دېرېۋېټىۋى مەۋجەتچىلىك:

1. $\frac{d}{dt} \int_V \rho dV = \int_V \frac{d\rho}{dt} dV + \int_{\partial V} \rho \mathbf{v} \cdot d\mathbf{A}$

2. $\frac{d}{dt} \int_V \rho \mathbf{r} dV = \int_V \rho \mathbf{r} \frac{d}{dt} dV + \int_{\partial V} \rho \mathbf{r} \mathbf{v} \cdot d\mathbf{A}$

ۋېك٩ر قىممەتلىك ئىنتېگرال:

1. $\int_V \nabla \cdot \mathbf{v} dV = \int_{\partial V} \mathbf{v} \cdot d\mathbf{A}$ (Gauss's theorem)

2. $\int_V \nabla \cdot (\mathbf{r} \otimes \mathbf{v}) dV = \int_{\partial V} \mathbf{r} \otimes \mathbf{v} \cdot d\mathbf{A}$ (Gauss's theorem for tensor fields)

3. $\int_V \nabla \cdot (\rho \mathbf{r} \otimes \mathbf{v}) dV = \int_{\partial V} \rho \mathbf{r} \otimes \mathbf{v} \cdot d\mathbf{A} + \int_V \rho \mathbf{r} \frac{d}{dt} dV + \int_{\partial V} \rho \mathbf{r} \mathbf{v} \cdot d\mathbf{A}$

زىمىن ئۆزگىرىش ۋە ئۆزگىرىش:

1. $\int_{V'} \rho' dV' = \int_V \rho dV$ (Volume element transformation)

2. $\int_{V'} \rho' \mathbf{r}' dV' = \int_V \rho \mathbf{r} dV$ (Position vector transformation)

3. $\int_{V'} \rho' \mathbf{r}' \otimes \mathbf{r}' dV' = \int_V \rho \mathbf{r} \otimes \mathbf{r} dV$ (Tensor transformation)

4. $\int_{V'} \rho' \mathbf{v}' dV' = \int_V \rho \mathbf{v} dV + \int_{\partial V} \rho \mathbf{v} \mathbf{r} \cdot d\mathbf{A}$ (Velocity transformation)

5. $\int_{V'} \rho' \mathbf{v}' \otimes \mathbf{r}' dV' = \int_V \rho \mathbf{v} \otimes \mathbf{r} dV + \int_{\partial V} \rho \mathbf{v} \mathbf{r} \otimes \mathbf{r} \cdot d\mathbf{A}$

(a) $\int_{V'} \rho' \mathbf{v}' \otimes \mathbf{v}' dV' = \int_V \rho \mathbf{v} \otimes \mathbf{v} dV + \int_{\partial V} \rho \mathbf{v} \mathbf{v} \otimes \mathbf{r} \cdot d\mathbf{A}$

(b) $\int_{V'} \rho' \mathbf{v}' \otimes \mathbf{v}' \otimes \mathbf{r}' dV' = \int_V \rho \mathbf{v} \otimes \mathbf{v} \otimes \mathbf{r} dV + \int_{\partial V} \rho \mathbf{v} \mathbf{v} \otimes \mathbf{r} \otimes \mathbf{r} \cdot d\mathbf{A}$

6. $\int_{V'} \rho' \mathbf{v}' \otimes \mathbf{v}' \otimes \mathbf{v}' dV' = \int_V \rho \mathbf{v} \otimes \mathbf{v} \otimes \mathbf{v} dV + \int_{\partial V} \rho \mathbf{v} \mathbf{v} \otimes \mathbf{v} \otimes \mathbf{r} \cdot d\mathbf{A}$

