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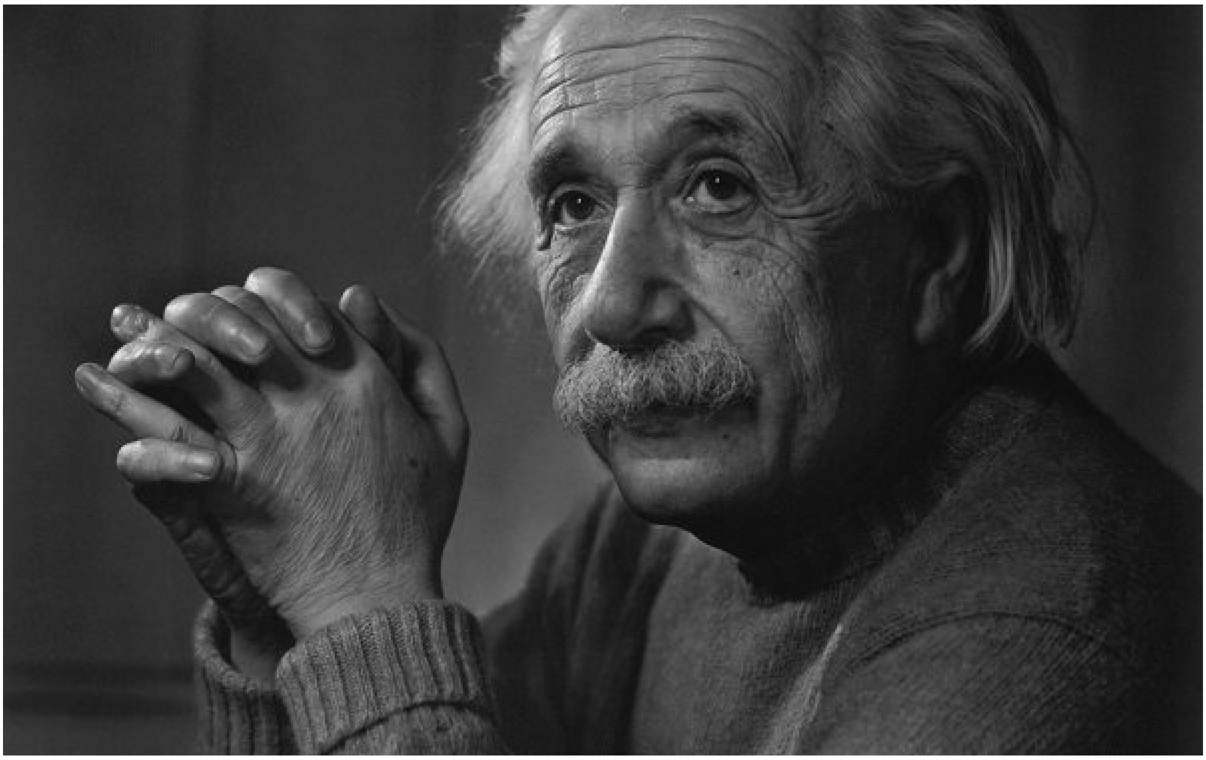
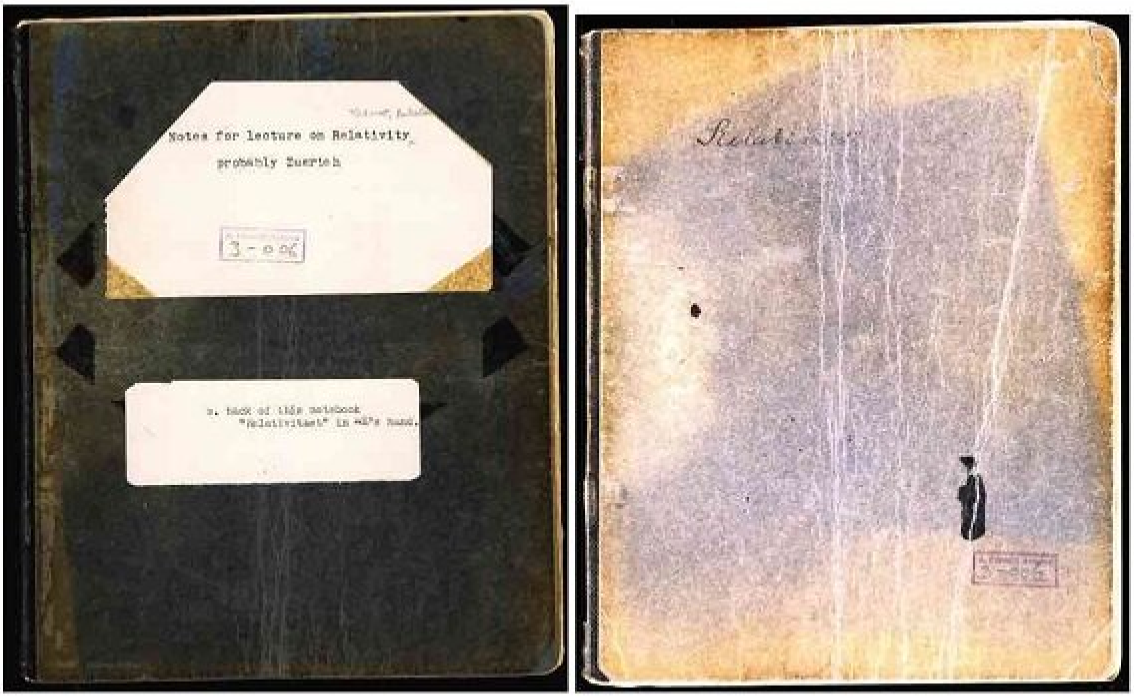



Notes for lecture on Relativity
probably Zuerich
s. back of this notebook
"Relativitaet" in AE's hand.

$ds^2 = \sum G_{\lambda\mu}\, dx_\lambda\, dx_\mu$

	x'_1	x'_2	x'_3	x'_4
x_1	α_{11}	α_{21}	α_{31}	α_{41}
x_2	α_{12}			
x_3	α_{13}			
x_4	α_{14}			

	x_1	x_2	x_3	x_4
x'_1	β_{11}			
x'_2	β_{12}			
x'_3	β_{13}			
x'_4	β_{14}			

$$\sum\sum G_{\lambda\mu}\, dx_\lambda\, dx_\mu = \sum\sum G'_{\rho\sigma}\, dx'_\rho\, dx'_\sigma$$

$$= \sum_\rho \sum_\sigma \sum_\eta \sum_\zeta G'_{\rho\sigma}\, \alpha_{\rho\eta}\, \alpha_{\sigma\zeta}\, dx_\eta\, dx_\zeta$$

$$G_{\lambda\mu} = \sum_\rho \sum_\sigma G'_{\rho\sigma}\, \alpha_{\rho\lambda}\, \alpha_{\sigma\mu} \qquad x'_\nu = \sum_\lambda \alpha_{\nu\lambda} x_\lambda$$

$$\frac{\partial}{\partial x_\lambda} = \sum_\nu \alpha_{\nu\lambda} \frac{\partial}{\partial x'_\nu}$$

analog

$$G'_{\lambda\mu} = \sum_\rho \sum_\sigma G_{\rho\sigma}\, \beta_{\rho\lambda}\, \beta_{\sigma\mu}$$

Spezialfall für die $G_{\lambda\mu}$

G_{11}	G_{22}	G_{33}	G_{44}
1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	c^2

$$c\Delta c - \frac{1}{2}\operatorname{grad}^2 c$$

$$c^2 \qquad 2c\frac{\partial c}{\partial x} \qquad 2\left(\frac{\partial c}{\partial x}\right)^2 + 2c\frac{\partial^2 c}{\partial x^2}$$

$$\Delta(c^2) = 2\operatorname{grad}^2 c + 2c\,\Delta c$$

$$\operatorname{grad}(c^2) = 2c \operatorname{grad} c$$

$$\frac{c^2}{2} = \gamma$$

$$\Delta\gamma = \operatorname{grad}^2 c + c\Delta c$$

$$\operatorname{grad}\gamma = c\operatorname{grad} c$$

$$\frac{\operatorname{grad}^2\gamma}{2\gamma} = \operatorname{grad}^2 c$$

$$\Delta\gamma - \frac{3}{4}\frac{\operatorname{grad}^2\gamma}{\gamma}$$

$dx' = dx + \alpha(y\,dx + x\,dy)$

$dy' = dy - \alpha y\,dy$

$x' = x + \alpha x t$

$t' = t - \alpha \frac{x^2}{2}$

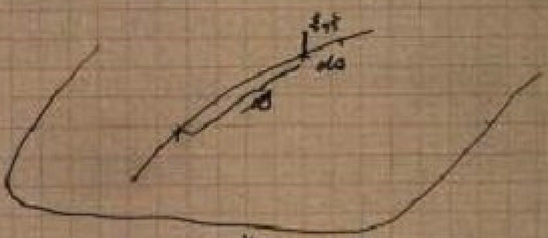
$x' = x + \frac{\alpha}{c} c \frac{\partial c}{\partial x} t^2$

$t' = ct$

$m \frac{d^2 x}{ds^2} = \frac{1}{m} \frac{\partial f}{\partial x} = \lambda' \frac{\partial f}{\partial x} \quad \frac{ds}{dt}$

$\frac{d^2 x}{ds^2} = \lambda'' \frac{\partial f}{\partial x}$

$f = 0$



$x + \xi \qquad x + \xi + \frac{dx}{ds} ds + d\xi$

$y + \eta \qquad ds'^2 = (dx + d\xi)^2 + \cdot + \cdot$

$z + \zeta \qquad = ds^2 + 2(dx\,d\xi + \cdot + \cdot)$

$= ds^2 \left(1 + 2\left(\frac{dx}{ds}\frac{d\xi}{ds} + \cdot + \cdot\right)\right)$

$ds' = ds\left(1 + \left(\frac{dx}{ds}\frac{d\xi}{ds} + \cdot + \cdot\right)\right)$

$ds' - ds = (\dot{x}\dot{\xi} + \cdot + \cdot)\,ds$

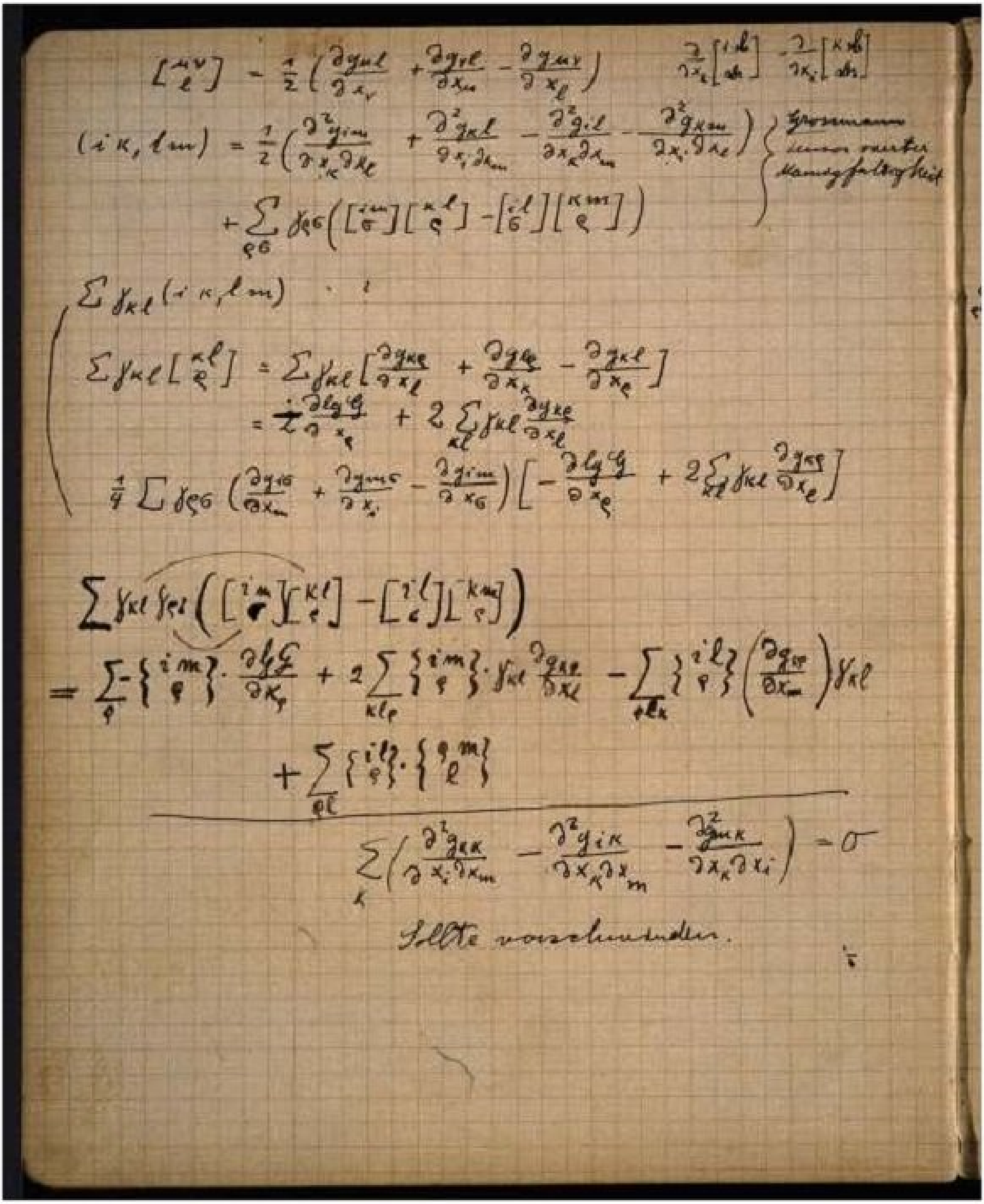
$\int \{(\dot{x}\dot{\xi} + \cdot + \cdot)\,ds\} = 0$

$\dot{x}\dot{\xi} = \frac{d}{ds}(\dot{x}\xi) - \xi\ddot{x}$

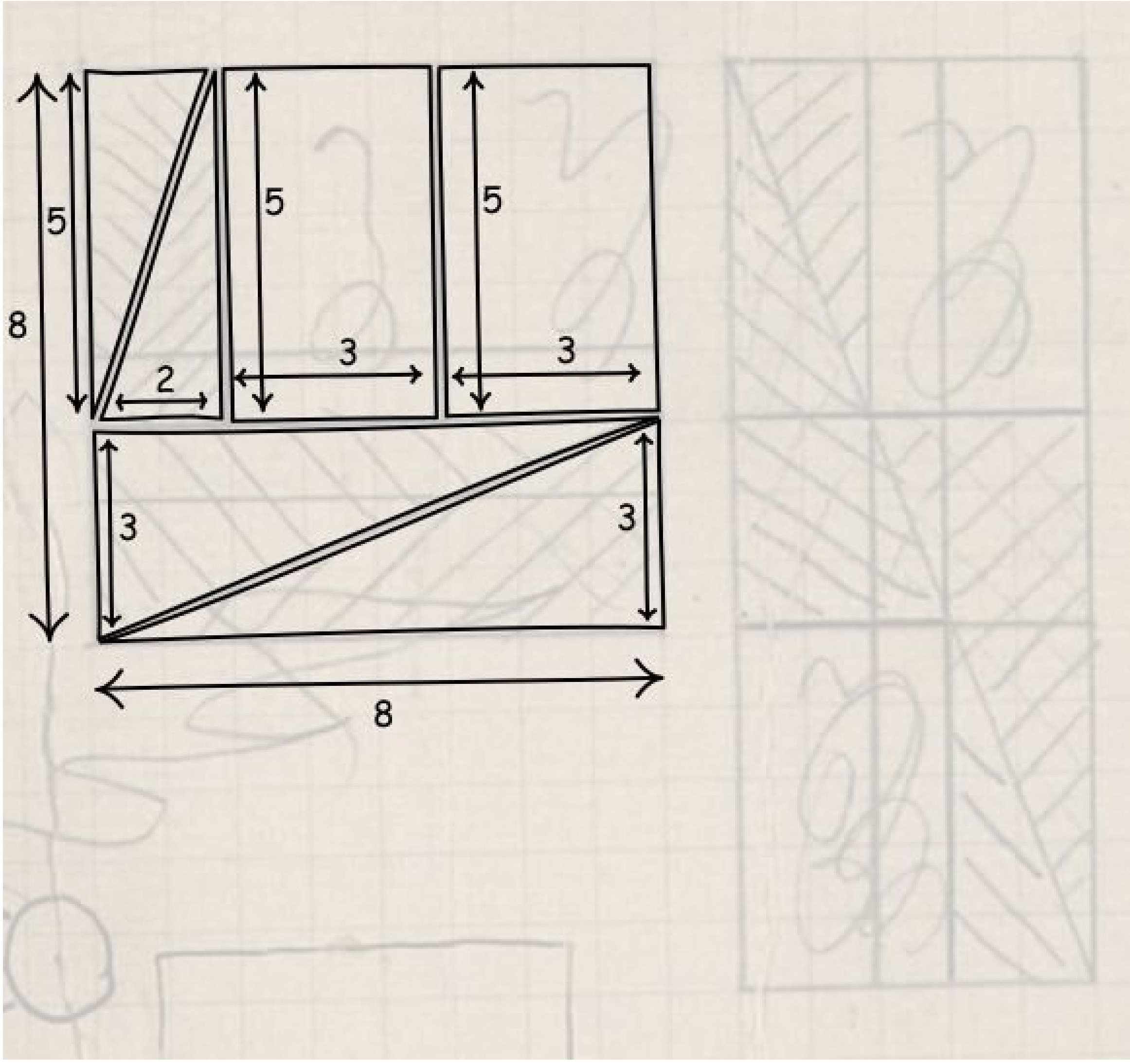
$\int = -\int (\ddot{x}\xi + \cdot + \cdot)\,ds = 0$

wenn $\frac{\partial f}{\partial x}\xi + \frac{\partial f}{\partial y}\eta + \frac{\partial f}{\partial z}\zeta = 0$

woraus die Behauptung



[illegible] 8x8=64 [illegible] 13x5=65 [illegible] 64=65 [illegible].



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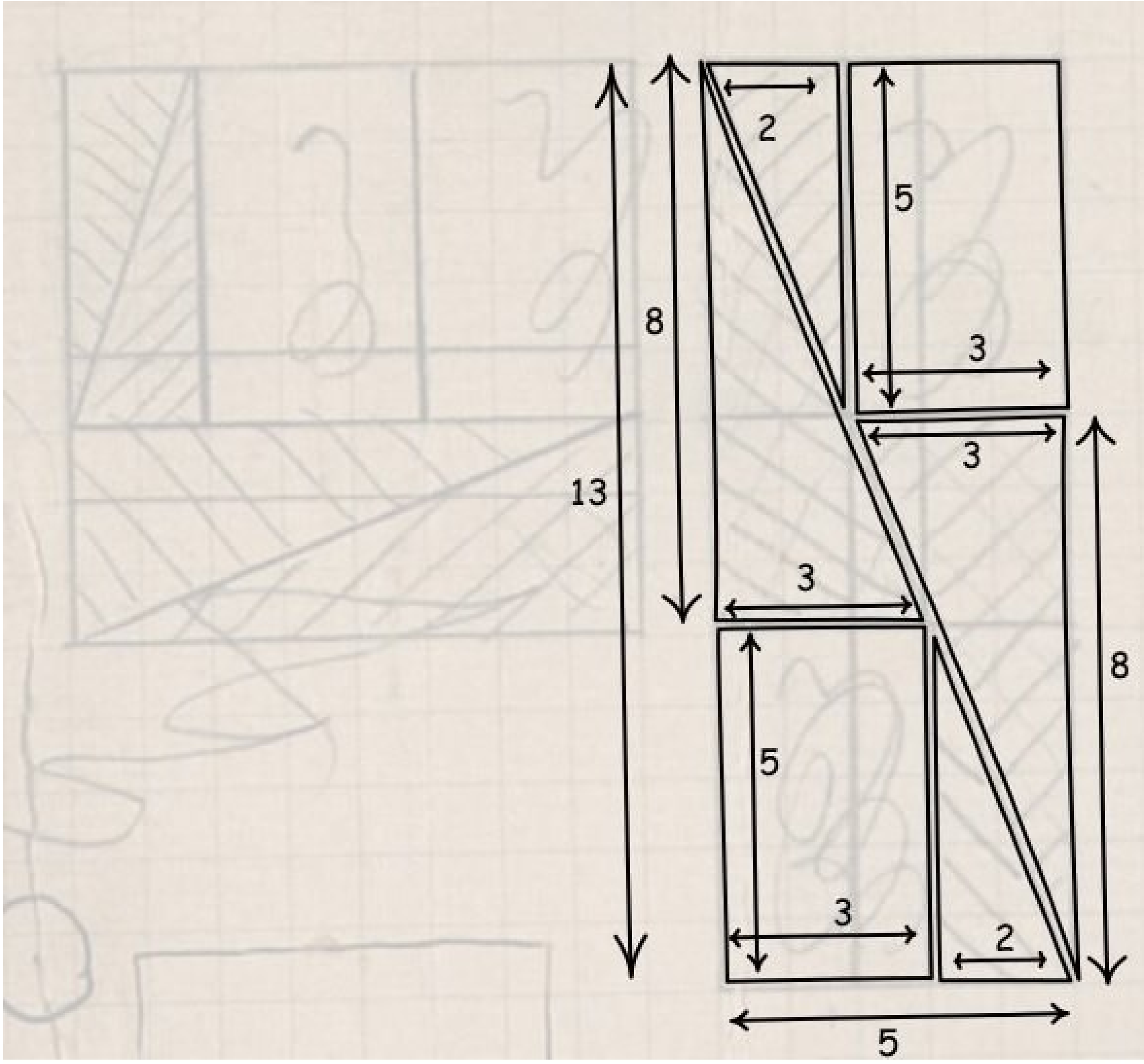

A
Peek into Einstein's Zurich Notebook

fossbytes

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[illegible]: https://www.shabakeh-mag.com/news/11334/%DB%8C%D8%A7%D8%AF%D8%AF%D8%A7%D8%B4%D8%AA%E2%80%8C%D9%87%D8%A7%DB%8C-%D8%A8%D8%B3%DB%8C%D8%A7%D8%B1-%D9%85%D8%B9%D8%B1%D9%88%D9%81-%D8%A7%DB%8C%D9%86%D8%B4%D8%AA%DB%8C%D9%86-%D9%87%D9%85%D8%A7%DA%A9%D9%86%D9%88%D9%86-%D8%A8%D9%87-%D8%B5%D9%88%D8%B1%D8%AA-%D8%A2%D9%86%D9%84%D8%A7%DB%8C%D9%86-%D8%AF%D8%B1-%D8%AF%D8%B3%D8%AA%D8%B1%D8%B3-%D8%B4%D9%85%D8%A7