SJECIŠTE ZRAKE I SFERE

$$(p-c)\cdot(p-c)-R^2=0$$

$$(e+td-c)\cdot(e+td-c)-R^2=0$$

$$(d\cdot d)t^2+2d(e-c)t+(e-c)\cdot(e-c)-R^2=0$$

$$t_{1,2}=\frac{-d(e-c)\pm\sqrt{(d(e-c))^2-(d\cdot d)((e-c)\cdot(e-c)-R^2)}}{d\cdot d}$$

SJECIŠTE ZRAKE I TROKUTA

$$\alpha+\beta+\gamma=1\ ;\quad e+td=\alpha a+\beta b+\gamma c=a+\beta(b-a)+\gamma(c-a)$$

$$\begin{bmatrix} x_a-x_b & x_a-x_c & x_d \\ y_a-y_b & y_a-y_c & y_d \\ z_a-z_b & z_a-z_c & z_d \end{bmatrix}\begin{bmatrix}\beta\\ \gamma\\ t\end{bmatrix}=\begin{bmatrix}x_a-x_e\\ y_a-y_e\\ z_a-z_e\end{bmatrix}$$

$$A=\begin{bmatrix} x_a-x_b & x_a-x_c & x_d \\ y_a-y_b & y_a-y_c & y_d \\ z_a-z_b & z_a-z_c & z_d \end{bmatrix}=\begin{bmatrix} a & d & g\\ b & e & h\\ c & f & i\end{bmatrix},\quad x=\begin{bmatrix}\beta\\ \gamma\\ t\end{bmatrix}\quad b=\begin{bmatrix}x_a-x_e\\ y_a-y_e\\ z_a-z_e\end{bmatrix}=\begin{bmatrix}i\\ j\\ k\end{bmatrix}$$

$$\beta=\frac{\det[b A_2 A_3]}{\det A},\quad \gamma=\frac{\det[A_1 b A_3]}{\det A},\quad t=\frac{\det[A_1 A_2 b]}{\det A}$$

$$\beta=\frac{j(ei-hf)+k(gf-di)+l(dh-eg)}{a(ei-hf)+b(gf-di)+c(dh-eg)}$$

$$\gamma=\frac{i(ak-jb)+h(jc-al)+g(bl-kc)}{a(ei-hf)+b(gf-di)+c(dh-eg)}$$

$$t=-\frac{f(ak-jb)+e(jc-al)+d(bl-kc)}{a(ei-hf)+b(gf-di)+c(dh-eg)}$$