

Determineu l'equació de la recta q paral·lela a la recta $r \equiv \begin{cases} 2x + y = 0 \\ 4x - z = 0 \end{cases}$ que és secant amb les rectes

$$s \equiv \begin{cases} x + y - 2 = 0 \\ 2x - y - z = 0 \end{cases} \text{ i } t \equiv \frac{x-1}{1} = \frac{y}{2} = \frac{z-1}{1}$$

Solució:

El vector director de la recta q és el vector director de la recta r

Resolem el sistema format per les equacions de la recta r per determinar l'equació paramètrica.

Obrim el *Menú Ecuación*

<div style="border: 1px solid black; padding: 2px;"> Math Rad Norm1 d/c a+bi $a_n X + b_n Y + C_n Z = d_n$ <table style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <td></td> <td style="text-align: center;">a</td> <td style="text-align: center;">b</td> <td style="text-align: center;">c</td> <td style="text-align: center;">d</td> </tr> <tr> <td style="text-align: right;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: right;">2</td> <td style="text-align: center;">4</td> <td style="text-align: center;">0</td> <td style="text-align: center;">-1</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: right;">3</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> </table> <div style="text-align: right; margin-top: 5px;"> SOLVE DELETE CLEAR EDIT </div> </div>		a	b	c	d	1	2	1	0	0	2	4	0	-1	0	3	0	0	0	0	<div style="border: 1px solid black; padding: 2px;"> Math Rad Norm1 d/c a+bi $a_n X + b_n Y + C_n Z = d_n$ $X = \frac{1}{4}Z$ $Y = -\frac{1}{2}Z$ $Z = Z$ <div style="text-align: right; margin-top: 5px;"> REPEAT </div> </div>
	a	b	c	d																	
1	2	1	0	0																	
2	4	0	-1	0																	
3	0	0	0	0																	

El vector director és

$$v_q = (1, -2, 4)$$

Passem la recta s a la forma paramètrica resolent el sistema $\begin{cases} x + y = 2 \\ 2x - y - z = 0 \end{cases}$

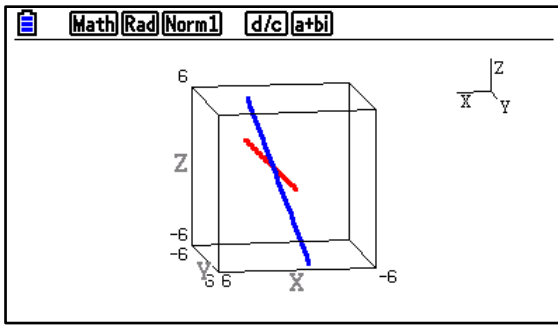
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L'equació paramètrica és $s \equiv \begin{cases} x = 1 + t \\ y = 1 - t \\ z = 1 + 3t \end{cases}$

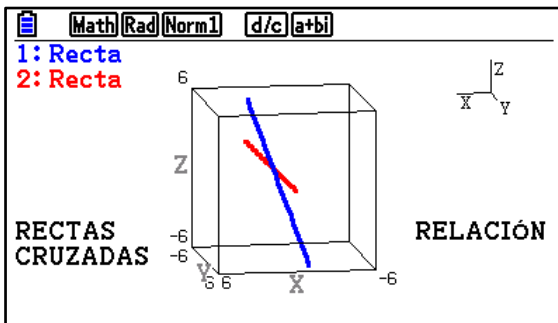
Obrim el *Menú Gráfico 3D*

Definim i representem les rectes s, t

<div style="border: 1px solid black; padding: 2px;"> Math Rad Norm1 d/c a+bi Punto de paso (X_0, Y_0, Z_0) Vector dirección $[a, b, c]$ <table style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <td style="text-align: center;">X₀</td> <td style="text-align: center;">Y₀</td> <td style="text-align: center;">Z₀</td> </tr> <tr> <td style="text-align: center;">[1]</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">a</td> <td style="text-align: center;">b</td> <td style="text-align: center;">c</td> </tr> <tr> <td style="text-align: center;">[1]</td> <td style="text-align: center;">-1</td> <td style="text-align: center;">3</td> </tr> </table> <div style="text-align: right; margin-top: 5px;"> EXPRESS VECTOR P&V POINTS EDIT SET </div> </div>	X ₀	Y ₀	Z ₀	[1]	1	1	a	b	c	[1]	-1	3	<div style="border: 1px solid black; padding: 2px;"> Math Rad Norm1 d/c a+bi Punto de paso (X_0, Y_0, Z_0) Vector dirección $[a, b, c]$ <table style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <td style="text-align: center;">X₀</td> <td style="text-align: center;">Y₀</td> <td style="text-align: center;">Z₀</td> </tr> <tr> <td style="text-align: center;">[1]</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">a</td> <td style="text-align: center;">b</td> <td style="text-align: center;">c</td> </tr> <tr> <td style="text-align: center;">[1]</td> <td style="text-align: center;">2</td> <td style="text-align: center;">[1]</td> </tr> </table> <div style="text-align: right; margin-top: 5px;"> EXPRESS VECTOR P&V POINTS EDIT SET </div> </div>	X ₀	Y ₀	Z ₀	[1]	0	1	a	b	c	[1]	2	[1]
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Amb la funció G-Solv estudiem la posició relativa de les dues rectes.



Les rectes es creuen.

Un punt genèric de la recta s és $P_s\left(\frac{2}{3} + \alpha, \frac{4}{3} - \alpha, 3\alpha\right)$

Un punt genèric de la recta t és $P_t(1 + \beta, 2\beta, 1 + \beta)$

$$\overrightarrow{P_s P_t} = \left(-\alpha + \beta + \frac{1}{3}, \alpha + 2\beta - \frac{4}{3}, -3\alpha + \beta + 1\right)$$

Els vectors $v_q, \overrightarrow{P_s P_t}$ són linealment dependents, les components són proporcionals.

$$\frac{-\alpha + \beta + \frac{1}{3}}{1} = \frac{\alpha + 2\beta - \frac{4}{3}}{-2} = \frac{-3\alpha + \beta + 1}{4}$$

Simplificant:

$$\begin{cases} \alpha - 4\beta = -\frac{2}{3} \\ -\alpha + 3\beta = -\frac{1}{3} \end{cases}$$

$$\begin{cases} \alpha = \frac{10}{3} \\ \beta = 1 \end{cases}$$

Els punts de la recta q són $P_s(4, -2, 10), P_t(2, 2, 2)$

L'equació de la recta q és:
 $q \equiv (x, y, z) = (2, 2, 2) + \mu(1, -2, 4)$

Definim i representem la recta q

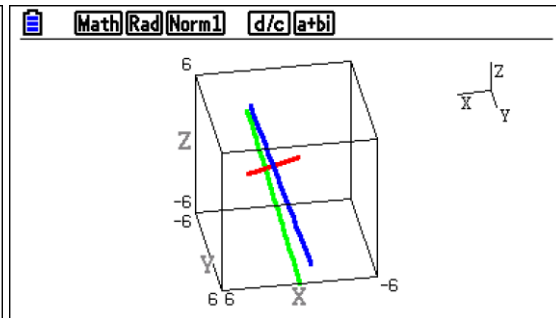
Math Rad Norm1 d/c | a+bi

$$\frac{X-X_0}{a} = \frac{Y-Y_0}{b} = \frac{Z-Z_0}{c}$$

X_0	Y_0	Z_0
2	2	2
a	b	c
1	-2	4

2

EXPRESS VECTOR P&V POINTS EDIT SET



Comprovem que la recta q talla les rectes s, t

Math Rad Norm1 d/c | a+bi

2: Recta
3: Recta

INTERSEC

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Math Rad Norm1 d/c | a+bi

1: Recta
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