

1

$$\begin{cases} x \equiv 7 \pmod{9} \\ x \equiv 3 \pmod{5} \end{cases} \quad R = 9 \cdot 5 = 45 \quad \begin{cases} R_1 = 5 \\ R_2 = 9 \end{cases}$$

$$a) 5t_1 + 9s_1 = 1 \Rightarrow t_1 = 2 \quad s_1 = (-1) \quad \tilde{x}_1 = 7 \cdot 2 = 14$$

$$b) 9t_2 + 5s_2 = 1 \Rightarrow t_2 = (-1) \quad s_2 = 2 \quad \tilde{x}_2 = 3 \cdot (-1) = -3$$

$$\tilde{x} = 14 \cdot 5 + (-3) \cdot 9 = 43$$

2

$$\begin{cases} 1025x \equiv 5312065 \pmod{8} \\ 36x \equiv 322 \pmod{5} \\ 4x \equiv 7 \pmod{3} \end{cases}$$

8, 5 e 3 sono tutti co-primi

$$a) \text{MCD}(1025, 8) := 1025 = 8 \cdot 128 + 1 \Rightarrow \text{MCD}(1025, 8) = 1$$

$$b) \text{MCD}(36, 5) := 36 = 5 \cdot 7 + 1 \Rightarrow \text{MCD}(36, 5) = 1$$

$$c) \text{MCD}(4, 3) = 1$$

tutte le equazioni ammettono soluzione!

trasformo a cinese:  $\forall i$  moltiplico per  $a_i^{-1}$ :

$$a) 1025x \equiv 5312065 \pmod{8} \Rightarrow \text{know} \quad 1025x \equiv 1 \pmod{8} \Rightarrow x = 1$$

$$x \equiv 5312065 \pmod{8}$$

$$b) 36x \equiv 1 \pmod{5} \Rightarrow 36^{-1} = 1 \quad c) 4^{-1} = 1 \pmod{3}$$

ottengo il sistema cinese:

$$\begin{cases} x \equiv 5312065 \pmod{8} \Rightarrow R_1 = \frac{120}{8} = 15 \\ x \equiv 322 \pmod{5} \Rightarrow R_2 = \frac{120}{5} = 24 \\ x \equiv 7 \pmod{3} \Rightarrow R_3 = \frac{120}{3} = 40 \end{cases}$$

$$a) 15t_1 + 8s_1 = 1 \Rightarrow t_1 = (-1) \Rightarrow \tilde{x}_1 = -5312065$$

$$b) 24t_2 + 5s_2 = 1 \Rightarrow t_2 = (-1) \Rightarrow \tilde{x}_2 = -322$$

$$c) 40t_3 + 3s_3 = 1 \Rightarrow t_3 = 1 \Rightarrow \tilde{x}_3 = 7$$

$$\Rightarrow \tilde{x} = \sum_{i=1}^3 \tilde{x}_i R_i = -79688423$$