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⟨Excercise 2.1⟩ 1. 2.8853 , s=5

2. -1.0069 , s=0.95

3. -0.9624 , s=1

⟨Excercise 3.3⟩

1. inverse sine is a elementy function (included) called using >>asin, ...

2. The greatest common divisor exists as command, >>gcd(A,B)
ie. >>gcd(3072,288) → 96 ✓ correct

3. dec2hex, convert decimal Int → hexidecimal
ie, dec2hex(61453) → F00D

4. Matlab includes alot of logarithmic functionality; arbitrary log, ln, base10, base2 etc...
as well as log rules/law operators.

Excerercise 4.1: A(2,2) = 5

$$A\backslash b \Rightarrow \begin{matrix} x_1 \\ x_2 \\ x_3 \end{matrix} = \begin{bmatrix} 2.3 \\ -0.2 \\ 0.9 \end{bmatrix}$$

new residual is $1.0\times10^{-15} \times \begin{bmatrix} -0.1110 \\ 0.4441 \\ 0.4441 \end{bmatrix}$

This is not 0 due to floating point errors, but the decimals are practically zero..

Excercise 4.2.1 : det (A's 3x3 upper left)
↳ >>det(A(1:3,1:3)) = 12

excercise 4.3.1 : ① inv(A)*A & A*inv(A)
return the indentity matrix (w/ some fp. error : -0.0 etc)

② inv(A*B) & inv(B)*inv(A), return equal matrices
(although matlabs "==" doesn't due to fpo errors)

3). A^(-1) == inv(A) $\Rightarrow$ logical array $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \end{bmatrix}$ ✓

ie <u>identical</u>

Excercise 4.4:

① A\b = $\begin{bmatrix} 0.05 \\ -0.0 \\ 1.5 \end{bmatrix}$ ✓ A(A\b) − b = $\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$ ✓

② Confirmed the A\b operator has greater efficiency over inv(A).b.

Excercise 5:

① $\begin{bmatrix} -8 & 3 & 5 \\ 3 & -12 & 4 \\ 5 & 4 & -12 \end{bmatrix} \begin{bmatrix} i_1 \\ i_2 \\ i_3 \end{bmatrix} = \begin{bmatrix} -5 \\ 0 \\ 0 \end{bmatrix} \Rightarrow$ $i_1 = 1.29A$, $i_2 = 0.564A$, $i_3 = 0.7256A$

✓

using Matlab: A\b = $\begin{bmatrix} 1.2903 \\ 0.5645 \\ 0.7258 \end{bmatrix}$

② $(V_1 = 12)$ ie $b = \begin{bmatrix} 12 \\ 0 \\ 0 \end{bmatrix}$, A\b = $\begin{bmatrix} 3.0968 \\ 1.3548 \\ 1.7419 \end{bmatrix}$

③ AØ = A
AØ(:,1) = b
i_1 = det(AØ) / det(A) = 3.0968 ✓

AØ = A
AØ(:,2) = b
i_2 (det(AØ) / det(A)) = 1.3548 ✓

AØ = A
AØ(:,3) = b
i_3 = det(AØ) / det(A) = 1.7419 ✓

Fig 5 Excercise.

[i_1 loop] $-i_1(6.8k + 4.7k + 2.2k) + i_2 4.7k + i_3 2.2k = -6$

[i_2 loop] $i_1 4.7k - i_2(2.7k + 8.2k + 4.7k) + i_4 8.2k = 6$

[i_3 loop] $i_1 2.2k - i_3(1.2k + 2.2k + 22k + i_4 22k = -5$

[i_4 loop] $i_2 8.2k + i_3 22k - i_4(1.1k + 22k + 8.2k) = 9$

$$\underbrace{\begin{bmatrix} -13.7k & 4.7k & 2.2k & 0 \\ 4.7k & -15.6k & 0 & 8.2k \\ 2.2k & 0 & -25.4k & 22k \\ 0 & 8.2k & 22k & -31.3k \end{bmatrix}}_{A} \begin{bmatrix} i_1 \\ i_2 \\ i_3 \\ i_4 \end{bmatrix} = \underbrace{\begin{bmatrix} -6 \\ 6 \\ -5 \\ 9 \end{bmatrix}}_{b}$$

$$A \backslash b \Rightarrow \begin{bmatrix} i_1 \\ i_2 \\ i_3 \\ i_4 \end{bmatrix} = \begin{bmatrix} 0.0324 \times 10^{-3} \\ -0.8837 \times 10^{-3} \\ -0.6388 \times 10^{-3} \\ -0.9681 \times 10^{-3} \end{bmatrix}$$