

```

[> restart :
[> with(HungarianAlgorithm) :
[> with(LinearAlgebra) :
[>

```

### Example 1 (n=3)

```

> R := RandomMatrix(3, generator = 1..1000);
R :=  $\begin{bmatrix} 652 & 557 & 111 \\ 185 & 881 & 297 \\ 777 & 250 & 68 \end{bmatrix}$  (1.1)

```

```

> M := MinimalPathWithHungarian(R)
M :=  $\begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$  (1.2)

```

```

> m := LengthOfMinimalPath(R, M)
m := 546 (1.3)

```

```

> m := BruteForce(R);
m := 546 (1.4)

```

(1.5)

### Example 2 (n=10) Hungarian vs Naïve

```

> R := RandomMatrix(10, generator = 1..1000);
R :=  $\begin{bmatrix} 142 & 953 & 721 & 789 & 802 & 235 & 660 & 940 & 813 & 50 \\ 601 & 464 & 984 & 881 & 653 & 228 & 287 & 246 & 906 & 157 \\ 72 & 95 & 935 & 962 & 613 & 469 & 798 & 906 & 537 & 872 \\ 253 & 889 & 874 & 679 & 603 & 787 & 77 & 48 & 627 & 73 \\ 855 & 600 & 939 & 892 & 153 & 223 & 950 & 479 & 99 & 592 \\ 76 & 596 & 101 & 880 & 809 & 7 & 921 & 419 & 392 & 427 \\ 131 & 155 & 100 & 562 & 27 & 13 & 496 & 930 & 596 & 741 \\ 682 & 445 & 924 & 995 & 514 & 46 & 659 & 910 & 962 & 918 \\ 682 & 60 & 679 & 778 & 192 & 411 & 197 & 213 & 10 & 836 \\ 697 & 970 & 361 & 26 & 7 & 903 & 81 & 772 & 459 & 404 \end{bmatrix}$  (2.1)

```

```

> t := time( ) :
M := MinimalPathWithHungarian(R) :

```

```
m := LenghtOfMinimalPath(R, M);  
time( ) - t;
```

```
m := 804  
0.008
```

**(2.2)**

```
> t := time( ) :  
m := BruteForce(R);  
time( ) - t;
```

```
m := 804  
210.066
```

**(2.3)**