

Path analysis:

[https://en.wikipedia.org/wiki/Path_analysis_\(statistics\)](https://en.wikipedia.org/wiki/Path_analysis_(statistics))

Knihy

<https://www.amazon.com/Latent-Variable-Models-John-Loehlin/dp/113891607>

<https://books.google.cz/books?id=q9zhGIIYw7kC>

<https://onlinelibrary.wiley.com/doi/book/10.1002/9781118619179>

<https://www.enbook.cz/catalog/product/view/id/399613?gclid=EAIaIQobChMI9>

Plán práce:

korelace

jednoduchá regrese (2 proměnné)

vícenásobná regrese (3 proměnné)

parciální korelace

faktorová analýza (1 faktor)

faktorová analýza (2 a více faktorů)

v Excelu

v dalších softwarech

explorační vs. konfirmační FA

strukturní modelování

2

[}N2Mv4yR9gIVVOJ3Ch1PeA5KEAQYASABEgJojvD_BwE](#)

| i | pohl (P) | vyska (V) | hmot (H) | mV - Vi | mH - Hi | zVi | zHi | zVi * zHi |
|----|----------|-----------|----------|----------|----------|----------|----------|-----------|
| 1 | 0 | 172 | 87 | -1.33333 | 11.66667 | -0.11572 | 0.604136 | -0.06991 |
| 2 | 1 | 169 | 61 | -4.33333 | -14.3333 | -0.3761 | -0.74222 | 0.279148 |
| 3 | 0 | 170 | 63 | -3.33333 | -12.3333 | -0.2893 | -0.63866 | 0.184767 |
| 4 | 1 | 166 | 85 | -7.33333 | 9.66667 | -0.63647 | 0.50057 | -0.3186 |
| 5 | 0 | 183 | 77 | 9.66667 | 1.66667 | 0.838984 | 0.086305 | 0.072409 |
| 6 | 0 | 168 | 58 | -5.33333 | -17.3333 | -0.46289 | -0.89757 | 0.415475 |
| 7 | 1 | 170 | 65 | -3.33333 | -10.3333 | -0.2893 | -0.53509 | 0.154805 |
| 8 | 0 | 190 | 90 | 16.66667 | 14.66667 | 1.446524 | 0.759485 | 1.098613 |
| 9 | 1 | 165 | 63 | -8.33333 | -12.3333 | -0.72326 | -0.63866 | 0.461917 |
| 10 | 1 | 152 | 51 | -21.3333 | -24.3333 | -1.85155 | -1.26005 | 2.333055 |
| 11 | 0 | 187 | 82 | 13.66667 | 6.66667 | 1.186149 | 0.34522 | 0.409483 |
| 12 | 0 | 185 | 125 | 11.66667 | 49.66667 | 1.012567 | 2.571892 | 2.604212 |
| 13 | 0 | 193 | 97 | 19.66667 | 21.66667 | 1.706898 | 1.121966 | 1.915082 |
| 14 | 0 | 163 | 61 | -10.3333 | -14.3333 | -0.89684 | -0.74222 | 0.66566 |
| 15 | 1 | 150 | 44 | -23.3333 | -31.3333 | -2.02513 | -1.62254 | 3.285852 |
| 16 | 1 | 173 | 68 | -0.33333 | -7.33333 | -0.02893 | -0.37974 | 0.010986 |
| 17 | 1 | 165 | 58 | -8.33333 | -17.3333 | -0.72326 | -0.89757 | 0.64918 |
| 18 | 1 | 171 | 65 | -2.33333 | -10.3333 | -0.20251 | -0.53509 | 0.108363 |
| 19 | 0 | 185 | 90 | 11.66667 | 14.66667 | 1.012567 | 0.759485 | 0.769029 |
| 20 | 0 | 172 | 72 | -1.33333 | -3.33333 | -0.11572 | -0.17261 | 0.019975 |
| 21 | 1 | 168 | 63 | -5.33333 | -12.3333 | -0.46289 | -0.63866 | 0.295627 |
| 22 | 0 | 194 | 113 | 20.66667 | 37.66667 | 1.793689 | 1.950496 | 3.498583 |
| 23 | 1 | 174 | 83 | 0.666667 | 7.66667 | 0.057861 | 0.397004 | 0.022971 |
| 24 | 0 | 175 | 87 | 1.666667 | 11.66667 | 0.144652 | 0.604136 | 0.08739 |

m 173.3333 75.33333 -9.5E-15 4.74E-15
sd 11.52188 19.31133

průměr 173.3333 75.33333
smoch 11.52188 19.31133

rVH

rVH

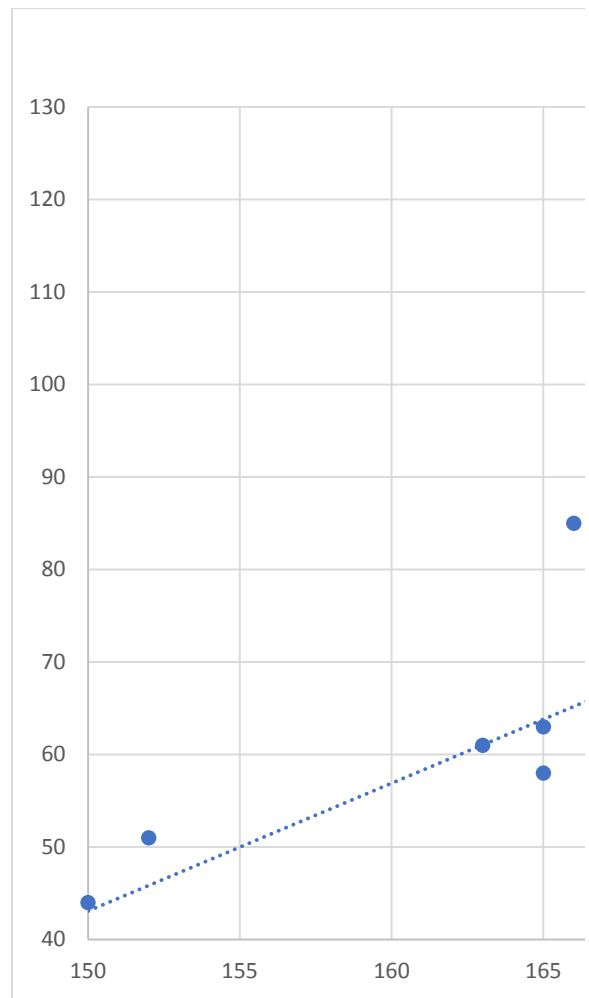
rPV

rPH

statistická \

$$t = \frac{r\sqrt{n}}{\sqrt{1-r^2}}$$

| H.stř | e |
|-------------|--------------|
| 73.49170306 | 13.50829694 |
| 69.34803493 | -8.348034934 |
| 70.72925764 | -7.729257642 |
| 65.20436681 | 19.79563319 |
| 88.68515284 | -11.68515284 |
| 67.96681223 | -9.966812227 |
| 70.72925764 | -5.729257642 |
| 98.35371179 | -8.35371179 |
| 63.8231441 | -0.823144105 |
| 45.86724891 | 5.132751092 |
| 94.21004367 | -12.21004367 |
| 91.44759825 | 33.55240175 |
| 102.4973799 | -5.497379913 |
| 61.06069869 | -0.06069869 |
| 43.10480349 | 0.895196507 |
| 74.87292576 | -6.872925764 |
| 63.8231441 | -5.823144105 |
| 72.11048035 | -7.110480349 |
| 91.44759825 | -1.447598253 |
| 73.49170306 | -1.491703057 |
| 67.96681223 | -4.966812227 |
| 103.8786026 | 9.12139738 |
| 76.25414847 | 6.745851528 |
| 77.63537118 | 9.364628821 |

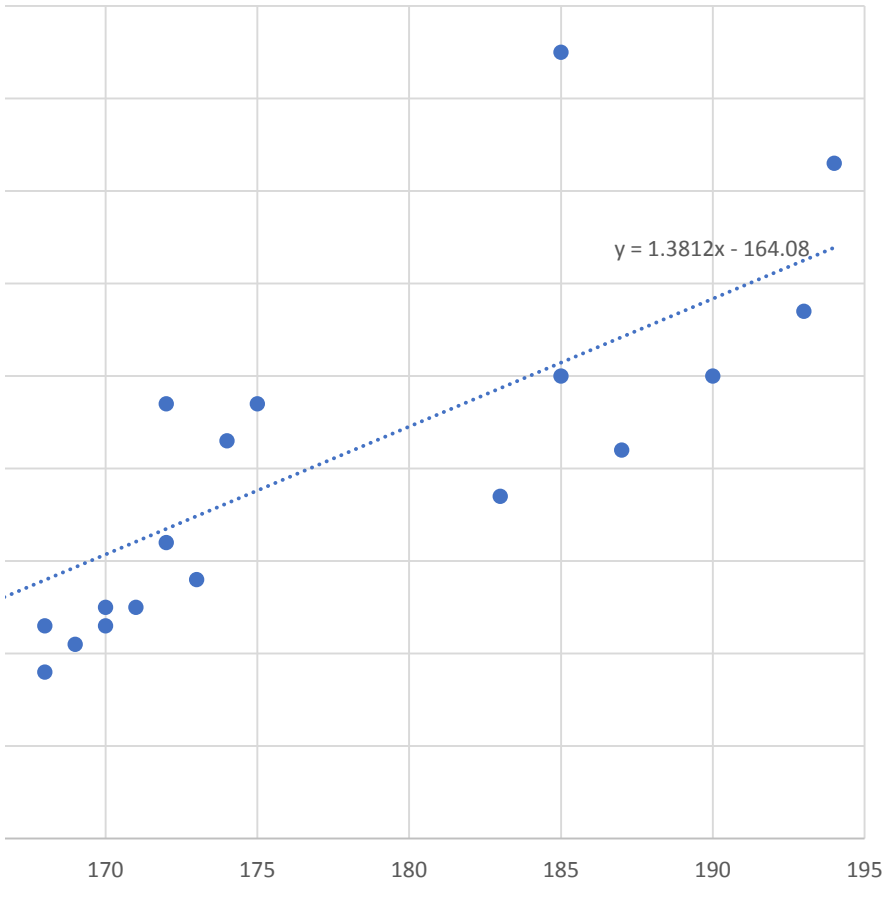


| koeficient determinace | | Matematický model | |
|------------------------|-------------|---------------------------|----------|
| 0.824090059 | | H.stříška.i = a + b * V.i | |
| 0.824090059 | 0.679124425 | a | -164.079 |
| -0.62030168 | 0.384774178 | b | 1.381223 |
| -0.54261029 | 0.294425922 | | |

významnost korelace

| | | |
|---------------------------------|----|----------|
| $\frac{-2}{\sqrt{0.824090059}}$ | t | 6.823665 |
| $22 - 2$ | df | 22 |
| 0.824090059 | p | 8.3E-07 |

hmot (H)



| i | pohl (P) | vyska (V) | hmot (H) | mV - Vi | mH - Hi | zVi | zHi | zVi * zHi |
|----|----------|-----------|----------|----------|----------|----------|----------|-----------|
| 1 | 0 | 172 | 87 | -1.33333 | 11.66667 | -0.11572 | 0.604136 | -0.06991 |
| 2 | 1 | 169 | 61 | -4.33333 | -14.3333 | -0.3761 | -0.74222 | 0.279148 |
| 3 | 0 | 170 | 63 | -3.33333 | -12.3333 | -0.2893 | -0.63866 | 0.184767 |
| 4 | 1 | 166 | 85 | -7.33333 | 9.66667 | -0.63647 | 0.50057 | -0.3186 |
| 5 | 0 | 183 | 77 | 9.66667 | 1.66667 | 0.838984 | 0.086305 | 0.072409 |
| 6 | 0 | 168 | 58 | -5.33333 | -17.3333 | -0.46289 | -0.89757 | 0.415475 |
| 7 | 1 | 170 | 65 | -3.33333 | -10.3333 | -0.2893 | -0.53509 | 0.154805 |
| 8 | 0 | 190 | 90 | 16.66667 | 14.66667 | 1.446524 | 0.759485 | 1.098613 |
| 9 | 1 | 165 | 63 | -8.33333 | -12.3333 | -0.72326 | -0.63866 | 0.461917 |
| 10 | 1 | 152 | 51 | -21.3333 | -24.3333 | -1.85155 | -1.26005 | 2.333055 |
| 11 | 0 | 187 | 82 | 13.66667 | 6.66667 | 1.186149 | 0.34522 | 0.409483 |
| 12 | 0 | 185 | 125 | 11.66667 | 49.66667 | 1.012567 | 2.571892 | 2.604212 |
| 13 | 0 | 193 | 97 | 19.66667 | 21.66667 | 1.706898 | 1.121966 | 1.915082 |
| 14 | 0 | 163 | 61 | -10.3333 | -14.3333 | -0.89684 | -0.74222 | 0.66566 |
| 15 | 1 | 150 | 44 | -23.3333 | -31.3333 | -2.02513 | -1.62254 | 3.285852 |
| 16 | 1 | 173 | 68 | -0.33333 | -7.33333 | -0.02893 | -0.37974 | 0.010986 |
| 17 | 1 | 165 | 58 | -8.33333 | -17.3333 | -0.72326 | -0.89757 | 0.64918 |
| 18 | 1 | 171 | 65 | -2.33333 | -10.3333 | -0.20251 | -0.53509 | 0.108363 |
| 19 | 0 | 185 | 90 | 11.66667 | 14.66667 | 1.012567 | 0.759485 | 0.769029 |
| 20 | 0 | 172 | 72 | -1.33333 | -3.33333 | -0.11572 | -0.17261 | 0.019975 |
| 21 | 1 | 168 | 63 | -5.33333 | -12.3333 | -0.46289 | -0.63866 | 0.295627 |
| 22 | 0 | 194 | 113 | 20.66667 | 37.66667 | 1.793689 | 1.950496 | 3.498583 |
| 23 | 1 | 174 | 83 | 0.666667 | 7.66667 | 0.057861 | 0.397004 | 0.022971 |
| 24 | 0 | 175 | 87 | 1.666667 | 11.66667 | 0.144652 | 0.604136 | 0.08739 |

m 173.3333 75.33333 -9.5E-15 4.74E-15
sd 11.52188 19.31133

průměr 173.3333 75.33333
smoch 11.52188 19.31133

rVH

rVH

rPV

rPH

statistická v

$$t = \frac{r\sqrt{n}}{\sqrt{1-r^2}}$$

Parciální korelace

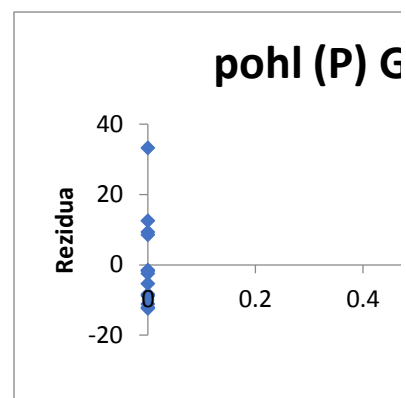
rVH.P

rPV.H

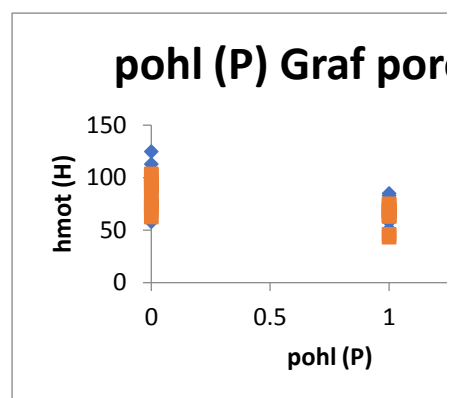
rPH.V

11
12
13
14
15
16
17
18
19
20
21
22
23
24

0.68073



| statistika |
|------------|
| 0.825063 |
| 0.68073 |
| 0.650323 |
| 11.41947 |
| 24 |



| Rozdíl | SS | MS | F | významnost F |
|--------|----------|----------|----------|--------------|
| 2 | 5838.845 | 2919.423 | 22.38749 | 6.22E-06 |
| 21 | 2738.488 | 130.4042 | | |
| 23 | 8577.333 | | | |

| Koeficienty | ba | stř. hodr. | t Stat | Hodnota P | Dolní 95% | Horní 95% | Dolní 95,0% | Horní 95,0% |
|-------------|----------|------------|----------|-----------|-----------|-----------|-------------|-------------|
| -153.985 | 47.47069 | -3.2438 | 0.003887 | -252.706 | -55.2646 | -252.706 | -55.2646 | |
| -1.93805 | 5.964391 | -0.32494 | 0.748443 | -14.3417 | 10.46558 | -14.3417 | 10.46558 | |
| 1.328117 | 0.263476 | 5.040746 | 5.44E-05 | 0.780188 | 1.876045 | 0.780188 | 1.876045 | |

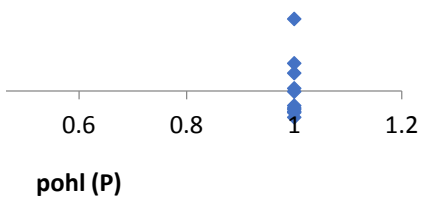
PRAVDĚPODOBNOST

| řávaná hmo | Residua | novaná residua | Percentil | hmot (H) |
|------------|----------|----------------|-----------|----------|
| 74.45079 | 12.54921 | 1.150072 | 2.083333 | 44 |
| 68.52838 | -7.52838 | -0.68994 | 6.25 | 51 |
| 71.79455 | -8.79455 | -0.80598 | 10.41667 | 58 |
| 64.54403 | 20.45597 | 1.874686 | 14.58333 | 58 |
| 89.06007 | -12.0601 | -1.10524 | 18.75 | 61 |
| 69.13832 | -11.1383 | -1.02077 | 22.91667 | 61 |
| 69.8565 | -4.8565 | -0.44507 | 27.08333 | 63 |
| 98.35689 | -8.35689 | -0.76587 | 31.25 | 63 |
| 63.21592 | -0.21592 | -0.01979 | 35.41667 | 63 |
| 45.9504 | 5.049601 | 0.46277 | 39.58333 | 65 |

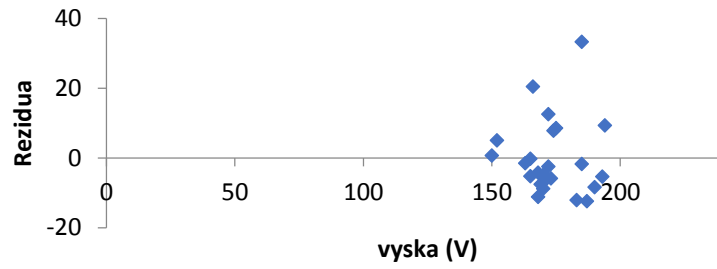
hmot (H)

| | | | | |
|----------|----------|----------|----------|-----|
| 94.37254 | -12.3725 | -1.13388 | 43.75 | 65 |
| 91.7163 | 33.2837 | 3.050282 | 47.91667 | 68 |
| 102.3412 | -5.34124 | -0.4895 | 52.08333 | 72 |
| 62.49774 | -1.49774 | -0.13726 | 56.25 | 77 |
| 43.29417 | 0.705834 | 0.064686 | 60.41667 | 82 |
| 73.84085 | -5.84085 | -0.53528 | 64.58333 | 83 |
| 63.21592 | -5.21592 | -0.47801 | 68.75 | 85 |
| 71.18461 | -6.18461 | -0.56679 | 72.91667 | 87 |
| 91.7163 | -1.7163 | -0.15729 | 77.08333 | 87 |
| 74.45079 | -2.45079 | -0.2246 | 81.25 | 90 |
| 67.20027 | -4.20027 | -0.38493 | 85.41667 | 90 |
| 103.6694 | 9.330648 | 0.855107 | 89.58333 | 97 |
| 75.16896 | 7.831035 | 0.717675 | 93.75 | 113 |
| 78.43514 | 8.564864 | 0.784926 | 97.91667 | 125 |

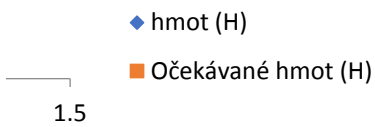
Graf s rezidui



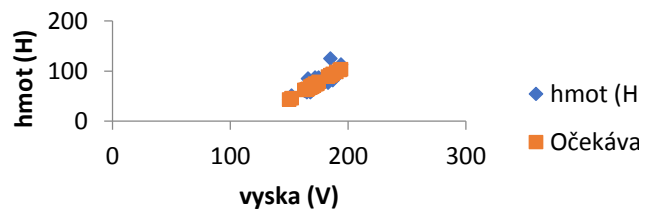
vyska (V) Graf s rezidui



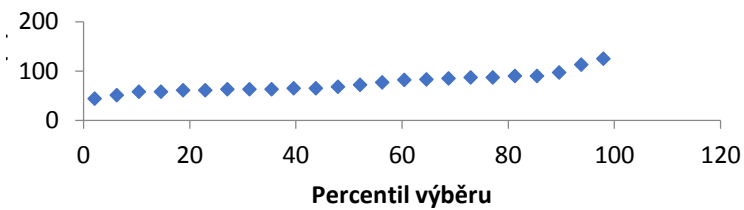
ovnění hodnot



vyska (V) Graf porovnáání hodnot



Graf s rozdělením pravděpodobnosti



250

l)
ané hmot (H)

| i | pohl (P) | vyska (V) | hmot (H) | mV - Vi | mH - Hi | zVi | zHi | zPi |
|---------------|----------|-----------|----------|----------|----------|----------|----------|----------|
| 1 | 0 | 172 | 87 | -1.33333 | 11.66667 | -0.11572 | 0.604136 | 0.900498 |
| 2 | 1 | 169 | 61 | -4.33333 | -14.3333 | -0.3761 | -0.74222 | -1.06423 |
| 3 | 0 | 170 | 63 | -3.33333 | -12.3333 | -0.2893 | -0.63866 | 0.900498 |
| 4 | 1 | 166 | 85 | -7.33333 | 9.66667 | -0.63647 | 0.50057 | -1.06423 |
| 5 | 0 | 183 | 77 | 9.66667 | 1.66667 | 0.838984 | 0.086305 | 0.900498 |
| 6 | 0 | 168 | 58 | -5.33333 | -17.3333 | -0.46289 | -0.89757 | 0.900498 |
| 7 | 1 | 170 | 65 | -3.33333 | -10.3333 | -0.2893 | -0.53509 | -1.06423 |
| 8 | 0 | 190 | 90 | 16.66667 | 14.66667 | 1.446524 | 0.759485 | 0.900498 |
| 9 | 1 | 165 | 63 | -8.33333 | -12.3333 | -0.72326 | -0.63866 | -1.06423 |
| 10 | 1 | 152 | 51 | -21.3333 | -24.3333 | -1.85155 | -1.26005 | -1.06423 |
| 11 | 0 | 187 | 82 | 13.66667 | 6.66667 | 1.186149 | 0.34522 | 0.900498 |
| 12 | 0 | 185 | 125 | 11.66667 | 49.66667 | 1.012567 | 2.571892 | 0.900498 |
| 13 | 0 | 193 | 97 | 19.66667 | 21.66667 | 1.706898 | 1.121966 | 0.900498 |
| 14 | 0 | 163 | 61 | -10.3333 | -14.3333 | -0.89684 | -0.74222 | 0.900498 |
| 15 | 1 | 150 | 44 | -23.3333 | -31.3333 | -2.02513 | -1.62254 | -1.06423 |
| 16 | 1 | 173 | 68 | -0.33333 | -7.33333 | -0.02893 | -0.37974 | -1.06423 |
| 17 | 1 | 165 | 58 | -8.33333 | -17.3333 | -0.72326 | -0.89757 | -1.06423 |
| 18 | 1 | 171 | 65 | -2.33333 | -10.3333 | -0.20251 | -0.53509 | -1.06423 |
| 19 | 0 | 185 | 90 | 11.66667 | 14.66667 | 1.012567 | 0.759485 | 0.900498 |
| 20 | 0 | 172 | 72 | -1.33333 | -3.33333 | -0.11572 | -0.17261 | 0.900498 |
| 21 | 1 | 168 | 63 | -5.33333 | -12.3333 | -0.46289 | -0.63866 | -1.06423 |
| 22 | 0 | 194 | 113 | 20.66667 | 37.66667 | 1.793689 | 1.950496 | 0.900498 |
| 23 | 1 | 174 | 83 | 0.666667 | 7.666667 | 0.057861 | 0.397004 | -1.06423 |
| 24 | 0 | 175 | 87 | 1.666667 | 11.66667 | 0.144652 | 0.604136 | 0.900498 |
| m | 0.458333 | 173.3333 | 75.33333 | -9.5E-15 | 4.74E-15 | -8.2E-16 | 2.04E-16 | 0 |
| sd | 0.508977 | 11.52188 | 19.31133 | | | 1 | 1 | 1 |
| průměr smodch | | 173.3333 | 75.33333 | | | | | |
| | | 11.52188 | 19.31133 | | | | | |

rVH

rVH

rPV

rPH

statistická \

$$t = \frac{r\sqrt{n}}{\sqrt{1-r^2}}$$

Parciální korelace

rVH.P

rPV.H

rPH.V

| H.stř | e.H | P.stř | e.P | |
|-------------|--------------|----------|----------|-----------|
| 73.49170306 | 13.50829694 | 0.494869 | -0.49487 | |
| 69.34803493 | -8.348034934 | 0.577074 | 0.422926 | |
| 70.72925764 | -7.729257642 | 0.549672 | -0.54967 | |
| 65.20436681 | 19.79563319 | 0.659279 | 0.340721 | |
| 88.68515284 | -11.68515284 | 0.19345 | -0.19345 | |
| 67.96681223 | -9.966812227 | 0.604476 | -0.60448 | |
| 70.72925764 | -5.729257642 | 0.549672 | 0.450328 | |
| 98.35371179 | -8.35371179 | 0.001638 | -0.00164 | |
| 63.8231441 | -0.823144105 | 0.686681 | 0.313319 | |
| 45.86724891 | 5.132751092 | 1.042904 | -0.0429 | |
| 94.21004367 | -12.21004367 | 0.083843 | -0.08384 | Předpověď |
| 91.44759825 | 33.55240175 | 0.138646 | -0.13865 | |
| 102.4973799 | -5.497379913 | -0.08057 | 0.080568 | b |
| 61.06069869 | -0.06069869 | 0.741485 | -0.74148 | a |
| 43.10480349 | 0.895196507 | 1.097707 | -0.09771 | |
| 74.87292576 | -6.872925764 | 0.467467 | 0.532533 | Předpověď |
| 63.8231441 | -5.823144105 | 0.686681 | 0.313319 | |
| 72.11048035 | -7.110480349 | 0.522271 | 0.477729 | b |
| 91.44759825 | -1.447598253 | 0.138646 | -0.13865 | a |
| 73.49170306 | -1.491703057 | 0.494869 | -0.49487 | |
| 67.96681223 | -4.966812227 | 0.604476 | 0.395524 | |
| 103.8786026 | 9.12139738 | -0.10797 | 0.107969 | |
| 76.25414847 | 6.745851528 | 0.440066 | 0.559934 | |
| 77.63537118 | 9.364628821 | 0.412664 | -0.41266 | |

koeficient determinace

0

| | |
|-------------|-------------|
| 0.824090059 | 0.679124425 |
| -0.62030168 | 0.384774178 |
| -0.54261029 | 0.294425922 |

významnost korelace

| | | |
|-------------------------|----|----------|
| $\frac{-2}{\sqrt{r^2}}$ | t | 6.823665 |
| | df | 22 |
| | p | 8.3E-07 |

pomocí vzorce Excelu (pearson)

| | |
|-------------|----------|
| 0.739934279 | |
| -0.36388373 | |
| -0.0707296 | -0.07073 |

H z V

1.381222707
-164.0786026

P z V

-0.027401747
5.207969432