*H1b:* Premises: ((P⭢Q)&(R⭢S)), (~Q&~S). Conclusion: (~P&~R)

|  |  |  |  |
| --- | --- | --- | --- |
| 1 |  | ((P⭢Q)&(R⭢S)) |  |
| 2 |  | (~Q&~S) |  |
| 3 |  | (R⭢S) |  |  , |
| 4 |  | (P⭢Q) |  |  , |
| 5 |  | ~Q |  |  , |
| 6 |  | ~S |  |  , |
| 7 |  | ~P |  |  , |
| 8 |  | ~R |  |  , |
| 9 |  | (~P&~R) |  |  , |

*H1a:* Premises: (P⭢Q)&~Q. Conclusion: ~P

|  |  |  |  |
| --- | --- | --- | --- |
| 1 |  | ((P⭢Q)&~Q) |  |
| 2 |  | (P⭢Q) |  |  , |
| 3 |  | ~Q |  |  , |
| 4 |  | ~P |  |  , |

*H1d:* Premises: (P⭢(R⭢S)), (R&P). Conclusion: S

|  |  |  |  |
| --- | --- | --- | --- |
| 1 |  | (P⭢ (R⭢S)) |  |
| 2 |  | (R&P) |  |
| 3 |  | P |  |  , |
| 4 |  | (R⭢S) |  |  , |
| 5 |  | R |  |  , |
| 6 |  | S |  |  , |

*H1c:* Premises: ((R&S)⭢T), (Q&~T). Conclusion: ~(R&S)

|  |  |  |  |
| --- | --- | --- | --- |
| 1 |  | ((R&S)⭢T) |  |
| 2 |  | (Q&~T) |  |
| 3 |  | ~T |  |  , |
| 4 |  | ~(R&S) |  |  , |

*H1e:* Premises: (P⭢(R⭢S)), (~S&P). Conclusion: ~R

|  |  |  |  |
| --- | --- | --- | --- |
| 1 |  | (P⭢ (R⭢S)) |  |
| 2 |  | (~S&P) |  |
| 3 |  | P |  |  , |
| 4 |  | (R⭢S) |  |  , |
| 5 |  | ~S |  |  , |
| 6 |  | ~R |  |  , |

*H2b:* Premises: ((P⭢Q)&(R⭢S)), (~Q&~S). Conclusion: (~P&~R)

|  |  |  |  |
| --- | --- | --- | --- |
| 1 |  | ((P⭢Q)&(R⭢S)) |  premise |
| 2 |  | (~Q&~S) |  premise |
| 3 |  |  |  |  1, simplification |
| 4 |  |  |  |  1, simplification |
| 5 |  |  |  |  2, simplification |
| 6 |  |  |  |  2, simplification |
| 7 |  |  |  |  4, 5 modus tollens |
| 8 |  |  |  |  3, 6 modus tollens |
| 9 |  |  |  |  7, 8 adjunction |

*H2a:* Premises: ((P⭢Q)&~Q). Conclusion: ~P

|  |  |  |  |
| --- | --- | --- | --- |
| 1 |  | ((P⭢Q)&~Q) |  premise |
| 2 |  |  |  |  1, simplification |
| 3 |  |  |  |  1, simplification |
| 4 |  |  |  |  2, 3 modus tollens |

*H2d:* Premises: (P⭢(R⭢S)), (R&P). Conclusion: S

|  |  |  |  |
| --- | --- | --- | --- |
| 1 |  | (P⭢ (R⭢S)) |  premise |
| 2 |  | (R&P) |  premise |
| 3 |  |  |  |  2, simplification |
| 4 |  |  |  |  1, 3 modus ponens |
| 5 |  |  |  |  2, simplification |
| 6 |  |  |  |  4, 5 modus ponens |

*H2c:* Premises: ((R&S)⭢T), (Q&~T). Conclusion: ~(R&S)

|  |  |  |  |
| --- | --- | --- | --- |
| 1 |  | ((R&S)⭢T) |  premise |
| 2 |  | (Q&~T) |  premise |
| 3 |  |  |  |  2, simplification |
| 4 |  |  |  |  1, 3 modus tollens |

*H2e:* Premises: (P⭢(R⭢S)), (~S&P). Conclusion: ~R

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 |  | (P⭢ (R⭢S)) |  premise |  |
| 2 |  | (~S&P) |  premise |  |
| 3 |  |  |  |  1, simplification |  , |
| 4 |  |  |  |  1, 3 modus ponens |  , |
| 5 |  |  |  |  2, simplification |  , |
| 6 |  |  |   |  4, 5 modus tollens |  , |