```
inv-is-edge  THM

⊢  ∀G:(Id→𝔹), to,from:(|G|→(IdLnk List)), l:Edge(G).
|  bi-graph(G;to;from) ⇒ lnk-inv(l) ∈ Edge(G)
| by Auto THEN DVar ‘l’ THEN Analyze
|
.....set predicate .....
1. G : Id→𝔹
2. to : |G|→(IdLnk List)
3. from : |G|→(IdLnk List)
4. l : IdLnk
5. ∃i:|G|. (l ∈ from(i))
6. bi-graph(G;to;from)
⊢  ∃i:|G|. (lnk-inv(l) ∈ from(i))
| by ExRepD THEN Unfold ‘bi-graph‘ -1 THEN InstHyp [i] -1 THEN ExRepD
|    THEN
|    All (Unfold ‘l_all‘)
|    THEN
|    InstHyp [l] -1
|    THEN
|    ExRepD
|    THEN
|    InstConcl [destination(l)]
|    THENA
|    MaAuto
|    THEN
|    InstHyp [lnk-inv(l)] -6
|    THEN
|    MaAuto
|    THEN
|    NthHypEq -2
|    THEN
|    Analyze
|    THEN
|    Analyze
|
.....subterm .....
1. G : Id→𝔹
2. to : |G|→(IdLnk List)
3. from : |G|→(IdLnk List)
4. l : IdLnk
5. i : |G|
6. (l ∈ from(i))
7. ∀i:|G|.
|  (∀l:IdLnk.
|   (l ∈ to(i))
|   ⇒
|   destination(l) = i
|   & G(source(l))
|   & (l ∈ from(source(l)))
|   & (lnk-inv(l) ∈ from(i)))
|  & (∀l:IdLnk.
|     (l ∈ from(i))
|     ⇒
|     source(l) = i
```

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|     & G(destination(l))
|     & (l ∈ to(destination(l)))
|     & (lnk-inv(l) ∈ to(i)))
8. ∀l:IdLnk.
|  (l ∈ to(i))
|  ⇒
|  destination(l) = i
|  & G(source(l))
|  & (l ∈ from(source(l)))
|  & (lnk-inv(l) ∈ from(i))
9. ∀l:IdLnk.
|  (l ∈ from(i))
|  ⇒
|  source(l) = i
|  & G(destination(l))
|  & (l ∈ to(destination(l)))
|  & (lnk-inv(l) ∈ to(i))
10. source(l) = i
11. G(destination(l))
12. (l ∈ to(destination(l)))
13. (lnk-inv(l) ∈ to(i))
14. destination(lnk-inv(l)) = i
15. G(source(lnk-inv(l)))
16. (lnk-inv(l) ∈ from(source(lnk-inv(l))))
17. (lnk-inv(lnk-inv(l)) ∈ from(i))
⊢  destination(l) = source(lnk-inv(l))  by Analyze
|
1. G : Id→𝔹
2. to : |G|→(IdLnk List)
3. from : |G|→(IdLnk List)
4. l : IdLnk
5. i : |G|
6. (l ∈ from(i))
7. ∀i:|G|.
   (∀l:IdLnk.
    (l ∈ to(i))
    ⇒
    destination(l) = i
    & G(source(l))
    & (l ∈ from(source(l)))
    & (lnk-inv(l) ∈ from(i)))
   & (∀l:IdLnk.
      (l ∈ from(i))
      ⇒
      source(l) = i
      & G(destination(l))
      & (l ∈ to(destination(l)))
      & (lnk-inv(l) ∈ to(i)))
8. ∀l:IdLnk.
   (l ∈ to(i))
   ⇒
   destination(l) = i
   & G(source(l))
   & (l ∈ from(source(l)))
   & (lnk-inv(l) ∈ from(i))
```

```
9. ∀l:IdLnk.
   (l ∈ from(i))
   ⇒
   source(l) = i
   & G(destination(l))
   & (l ∈ to(destination(l)))
   & (lnk-inv(l) ∈ to(i))
10. source(l) = i
11. G(destination(l))
12. (l ∈ to(destination(l)))
13. (lnk-inv(l) ∈ to(i))
14. destination(lnk-inv(l)) = i
15. G(source(lnk-inv(l)))
16. (lnk-inv(l) ∈ from(source(lnk-inv(l))))
17. (lnk-inv(lnk-inv(l)) ∈ from(i))
⊢  destination(l) = source(lnk-inv(l))
  by Symmetry
     THEN
     BackThru
     Thm* ∀l:IdLnk. source(lnk-inv(l)) = destination(l)
     {lsrc_DASH_inv}
END
```