C:/Users/torsten/GitHub/colore/ontologies/multidim_space_physcont/fullphyscont_full.clif

1. $\forall x\ \forall y\ \Big[\Big[\text{osurroundsvoid}(y,x) \leftrightarrow \big(\text{surroundsvoid}(y,x) \wedge \neg\big(\text{enclosesvoid}(y,x)\big) \wedge \neg\big(\text{isurroundsvoid}(y,x)\big)$
2. $\forall x\ \forall y\ \Big[\Big[\text{isurroundsvoid}(y,x) \leftrightarrow \big(\text{surroundsvoid}(y,x) \wedge \neg\big(\text{P}(\text{r}(x),\text{voidspaceall}(y))\big)\big)\Big]\Big]$
3. $\forall x\ \forall y\ \Big[\Big[\text{hostsvany}(y,x) \leftrightarrow \big(\text{hostsv}(y,x) \vee \text{hostsv1}(y,x) \vee \text{hostsv2}(y,x) \vee \text{hostsv3}(y,x)\big)\Big]\Big]$
4. $\forall x\ \forall y\ \Big[\Big[\text{PO}(y,\text{voidspaceall}(x)) \leftrightarrow \exists v\ \Big[\big(\text{hostsvany}(x,v) \wedge \text{PO}(y,\text{r}(v))\big)\Big]\Big]\Big]$
5. $\forall x\ \Big[\Big[\Big(\text{mat}(x) \wedge \neg\big(\text{ZEX}(\text{voidspaceall}(x))\big)\Big) \rightarrow \exists y\ \exists h\ \Big[\big(=(\text{r}(y),\text{voidspaceall}(x)) \wedge \text{hostsv}(h,y)\big)\Big]\Big]\Big]$
6. $\forall x\ \forall y\ \Big[\Big[\text{VS}(x,y) \leftrightarrow \big(\text{PED}(x) \wedge \text{S}(y) \wedge \text{Cont}(y,\text{ch}(x)) \wedge \neg\big(\text{PO}(y,\text{r}(x))\big)\big)\Big]\Big]$
7. $\forall x\ \forall y\ \Big[\Big[\text{SimpleV}(y) \leftrightarrow \Big(\text{ICon}(\text{r}(y)) \wedge \exists x\ \big[\text{hostsv}(x,y)\big]\Big)\Big]\Big]$
8. $\forall x\ \forall y\ \Big[\Big[\text{ComplexV}(y) \leftrightarrow \Big(\neg\big(\text{ICon}(\text{r}(y))\big) \wedge \exists x\ \big[\text{hostsv}(x,y)\big]\Big)\Big]\Big]$
9. $\forall x\ \Big[\Big[\text{V}(x) \leftrightarrow \big(\text{SimpleV}(x) \vee \text{ComplexV}(x)\big)\Big]\Big]$
10. $\forall x\ \forall y\ \Big[\Big[\text{hostsv}(x,y) \rightarrow \big(\text{hosts}(x,y) \wedge \text{VS}(x,\text{r}(y)) \wedge \text{StrongC}(\text{r}(x),\text{r}(y))\big)\Big]\Big]$
11. $\forall x\ \forall y\ \forall z\ \Big[\Big[\big(\text{hostsv}(x,y) \wedge \text{ComplexV}(y) \wedge \text{PO}(\text{r}(z),\text{r}(y))\big) \rightarrow \exists v\ \Big[\big(\text{hostsv}(x,v) \wedge \text{SimpleV}(v) \wedge \text{PO}(\text{r}(z)$
12. $\forall x\ \forall y\ \Big[\Big[\big(\text{hosts}(x,y) \wedge \text{V}(y)\big) \rightarrow \neg\big(\text{V}(x)\big)\Big]\Big]$
13. $\forall x\ \forall y\ \Big[\Big[\Big[\big(\text{hostsv}(x,y) \wedge \text{RPF}(x)\big) \rightarrow \exists z\ \Big[\Big(\text{hosts}(z,x) \wedge \neg\big(\text{F}(z)\big) \wedge \text{hostsv}(z,y)\Big)\Big]\Big]\Big]$
14. $\forall x\ \forall y\ \Big[\Big[\Big(\text{hostsv}(x,y) \wedge \neg\big(\text{F}(x)\big)\Big) \rightarrow \exists z\ \Big[\big(\text{hosts}(x,z) \wedge \text{RPF}(z) \wedge \text{hostsv}(z,y)\big)\Big]\Big]\Big]$

15. $\forall x\ \forall y\ \forall z\ \Big[\Big[\big(\mathrm{hostsv}(x,y) \wedge \mathrm{hostsv}(x,z) \wedge \mathrm{PO}(\mathrm{r}(y),\mathrm{r}(z))\big) \rightarrow \big(\mathrm{Cont}(\mathrm{r}(y),\mathrm{r}(z)) \vee \mathrm{Cont}(\mathrm{r}(z),\mathrm{r}(y))\big)\Big]\Big]$

16. $\forall x\ \forall y\ \forall v\ \Big[\Big[\Big(\big(\mathrm{hostsv}(x,v) \wedge \mathrm{P}(\mathrm{r}(x),\mathrm{r}(y)) \wedge \mathrm{PED}(y) \wedge \neg\big(\mathrm{DPF}(y)\big) \wedge \neg\big(\mathrm{Cont}(\mathrm{r}(v),\mathrm{r}(y))\big)\big) \rightarrow \exists u\ \Big[\big(\mathrm{Cont}(\mathrm{d}$

17. $\forall x\ \forall y\ \forall v\ \Big[\Big[\Big(\big(\mathrm{hostsv}(x,v) \wedge \mathrm{P}(\mathrm{r}(y),\mathrm{r}(x)) \wedge \mathrm{PED}(y) \wedge \neg\big(\mathrm{DPF}(y)\big) \wedge \mathrm{PO}(\mathrm{r}(v),\mathrm{ch}(y))\big) \rightarrow \exists u\ \Big[\big(=(\mathrm{r}(u),\mathrm{inte}$

18. $\forall x\ \forall y\ \forall z\ \Big[\Big[\Big(\big(\mathrm{mat}(y) \wedge \mathrm{mat}(z) \wedge \mathrm{hostsv}(y,x) \wedge \mathrm{P}(\mathrm{r}(y),\mathrm{r}(z)) \wedge \neg\big(\mathrm{PO}(\mathrm{r}(z),\mathrm{r}(x))\big)\big) \rightarrow \mathrm{hostsv}(z,x)\Big]\Big]$

19. $\forall x\ \Big[\Big[\mathrm{mat}(x) \leftrightarrow \big(\mathrm{POB}(x) \vee \mathrm{M}(x) \vee \mathrm{RPF}(x)\big)\Big]\Big]$

20. $\forall x\ \Big[\Big[\mathrm{PED}(x) \rightarrow \big(\mathrm{POB}(x) \vee \mathrm{M}(x) \vee \mathrm{F}(x)\big)\Big]\Big]$

21. $\forall x\ \Big[\big[\mathrm{POB}(x) \rightarrow \mathrm{PED}(x)\big]\Big]$

22. $\forall x\ \Big[\big[\mathrm{M}(x) \rightarrow \mathrm{PED}(x)\big]\Big]$

23. $\forall x\ \Big[\big[\mathrm{F}(x) \rightarrow \mathrm{PED}(x)\big]\Big]$

24. $\forall x\ \Big[\Big[\mathrm{POB}(x) \rightarrow \neg\big(\mathrm{M}(x)\big)\Big]\Big]$

25. $\forall x\ \Big[\Big[\mathrm{POB}(x) \rightarrow \neg\big(\mathrm{F}(x)\big)\Big]\Big]$

26. $\forall x\ \Big[\Big[\mathrm{M}(x) \rightarrow \neg\big(\mathrm{F}(x)\big)\Big]\Big]$

27. $\forall x\ \Big[\big[\mathrm{NAPO}(x) \rightarrow \mathrm{POB}(x)\big]\Big]$

28. $\forall x\ \forall y\ \Big[\Big[\mathrm{hosts}(x,y) \rightarrow \big(\mathrm{PED}(x) \wedge \mathrm{F}(y)\big)\Big]\Big]$

29. $\forall x\ \Big[\Big[\mathrm{F}(x) \leftrightarrow \exists y\ \big[\mathrm{hosts}(y,x)\big]\Big]\Big]$

30. $\forall x\ \forall y\ \Big[\Big[\mathrm{hosts}(x,y) \rightarrow \neg\big(\mathrm{hosts}(y,x)\big)\Big]\Big]$

31. $\forall x\ \Big[\Big[\mathrm{F}(x) \leftrightarrow \big(\mathrm{RPF}(x) \vee \mathrm{DPF}(x)\big)\Big]\Big]$

32. $\forall x \ \Big[\Big(\neg\big(\mathrm{RPF}(x)\big) \vee \neg\big(\mathrm{DPF}(x)\big)\Big)\Big]$

33. $\forall x \ \big[\mathrm{S}(\mathrm{ch}(x))\big]$

34. $\forall x \ \big[=(\mathrm{ch}(x), \mathrm{ch}(\mathrm{r}(x)))\big]$

35. $\forall x \ \Big[\big[\neg\big(\mathrm{ZEX}(x)\big) \to \mathrm{ICon}(\mathrm{ch}(x))\big]\Big]$

36. $\forall x \ \big[=(\mathrm{ch}(x), \mathrm{ch}(\mathrm{ch}(x)))\big]$

37. $\forall x \ \Big[\big[\neg\big(\mathrm{ZEX}(x)\big) \to \mathrm{Cont}(\mathrm{r}(x), \mathrm{ch}(x))\big]\Big]$

38. $\forall x \ \Big[\Big[\Big(\neg\big(\mathrm{ZEX}(x)\big) \wedge \neg\big(\mathrm{Closed}(\mathrm{r}(x))\big)\Big) \to \mathrm{TCont}(\mathrm{r}(x), \mathrm{ch}(x))\Big]\Big]$

39. $\forall x \ \forall y \ \Big[\big[\mathrm{Cont}(\mathrm{r}(x), \mathrm{r}(y)) \to \mathrm{Cont}(\mathrm{ch}(x), \mathrm{ch}(y))\big]\Big]$

40. $\forall x \ \forall y \ \Big[\Big[\Big(=(\mathrm{ch}(x), \mathrm{ch}(y)) \wedge \neg\big(\mathrm{ZEX}(x)\big)\Big) \to \mathrm{C}(\mathrm{r}(x), \mathrm{r}(y))\Big]\Big]$

41. $\forall x \ \forall y \ \Big[\Big[\big(\mathrm{MaxDim}(\mathrm{r}(x)) \wedge \mathrm{MaxDim}(\mathrm{r}(y)) \wedge =(\mathrm{r}(x), \mathrm{ch}(x)) \wedge =(\mathrm{r}(y), \mathrm{ch}(y))\big) \to =(\mathrm{intersection}(\mathrm{ch}(x), \mathrm{ch}(y$

42. $\forall x \ \forall y \ \Big[\Big[\Big(\mathrm{ICont}(\mathrm{r}(x), \mathrm{r}(y)) \wedge \neg\big(\mathrm{Closed}(\mathrm{difference}(\mathrm{r}(y), \mathrm{r}(x)))\big)\Big) \to \neg\big(=(\mathrm{difference}(\mathrm{r}(y), \mathrm{r}(x)), \mathrm{ch}(\mathrm{differen}$

43. $\forall x \ \forall y \ \Big[\Big[\big(\mathrm{ICont}(\mathrm{r}(x), \mathrm{r}(y)) \wedge \mathrm{MaxDim}(\mathrm{r}(x)) \wedge \mathrm{MaxDim}(\mathrm{r}(y))\big) \to \mathrm{Cont}(\mathrm{r}(x), \mathrm{ch}(\mathrm{difference}(\mathrm{r}(y), \mathrm{r}(x))))\Big]\Big]$

44. $\forall x \ \forall y \ \Big[\Big[\Big(\neg\big(\mathrm{ZEX}(x)\big) \vee \neg\big(\mathrm{ZEX}(y)\big)\Big) \to \exists z \ \exists v \ \Big[\big(\mathrm{TSum}(\mathrm{r}(x), \mathrm{r}(y), \mathrm{r}(z)) \wedge \mathrm{TSum}(\mathrm{ch}(x), \mathrm{ch}(y), \mathrm{r}(v)) \wedge \mathrm{Co}$

45. $\forall x \ \forall y \ \forall z \ \forall v \ \forall w \ \Big[\Big[\Big(\mathrm{EqDim}(x, y) \wedge \mathrm{EqDim}(y, z) \wedge \mathrm{SC}(x, y) \wedge \mathrm{SC}(y, z) \wedge \neg\big(\mathrm{C}(x, z)\big) \wedge \mathrm{TSum}(x, y, v) \wedge \mathrm{TS}$

46. $\forall x \ \forall y \ \forall z \ \forall v \ \Big[\Big[\big(\mathrm{TSum}(x, y, z) \wedge \mathrm{TSum}(x, y, v)\big) \to \big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \mathrm{S}(z) \wedge =(v, z)\big)\Big]\Big]$

47. $\forall x \ \forall y \ \forall z \ \Big[\big[\mathrm{TSum}(x, y, z) \to \mathrm{TSum}(y, x, z)\big]\Big]$

48. $\forall x \ \forall y \ \Big[\big[\mathrm{lt}(x, y) \to \mathrm{TSum}(x, y, y)\big]\Big]$

49. $\forall x \ \forall y \ \forall z \ \forall v \ \Big[\Big[\big(\mathrm{TSum}(x, y, z) \wedge \mathrm{leq}(x, y) \wedge \mathrm{Cont}(v, y)\big) \to \mathrm{Cont}(v, z)\Big]\Big]$

50. $\forall x\ \forall y\ \forall z\ \forall v\ \Big[\Big[\Big(\mathrm{TSum}(x,y,z) \wedge \mathrm{Cont}(v,z) \wedge \neg\ \big(\mathrm{Cont}(v,x)\big)\Big) \rightarrow \mathrm{Cont}(\mathrm{difference}(v,x),y)\Big]\Big]$

51. $\forall x\ \forall y\ \forall z\ \Big[\Big[\Big[\Big(\mathrm{S}(z) \wedge \mathrm{EqDim}(x,y) \wedge \forall v\ \Big[\big[\mathrm{PO}(v,z) \leftrightarrow \big(\mathrm{PO}(v,x) \vee \mathrm{PO}(v,y)\big)\big]\Big]\Big) \rightarrow \mathrm{TSum}(x,y,z)\Big]\Big]$

52. $\forall x\ \forall y\ \Big[\Big[\Big(\mathrm{EqDim}(x,y) \wedge \forall z\ \Big[\Big[\big(\mathrm{Cont}(z,x) \wedge \mathrm{Cont}(z,y) \wedge \mathrm{Min}(z)\big) \rightarrow \exists u\ \exists v\ \Big[\big(\mathrm{P}(u,x) \wedge \mathrm{P}(v,y) \wedge \mathrm{BCont}$

53. $\forall x\ \Big[\Big[\Big(\mathrm{S}(x) \wedge \neg\ \big(\mathrm{ZEX}(x)\big)\Big) \rightarrow \mathrm{Cont}(x,CUni)\Big]\Big]$

54. $\forall x\ \Big[\Big[\Big(\mathrm{S}(x) \wedge \neg\ \big(\mathrm{ZEX}(x)\big)\Big) \rightarrow \exists y\ \Big[\big(\mathrm{P}(y,x) \wedge \mathrm{Min}(y)\big)\Big]\Big]\Big]$

55. $\forall x\ \forall y\ \Big[\Big[\big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \mathrm{BCont}(x,y)\big) \rightarrow \big(\mathrm{Cont}(x,y) \wedge \mathrm{Inc}(x,y)\big)\Big]\Big]$

56. $\forall x\ \forall y\ \forall v\ \forall z\ \Big[\Big[\big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \mathrm{S}(v) \wedge \mathrm{S}(z) \wedge \mathrm{SC}(x,y) \wedge \mathrm{Min}(x) \wedge \mathrm{P}(x,v) \wedge \mathrm{Cont}(y,v) \wedge \mathrm{Cont}(z,x) \wedge \mathrm{Cont}($

57. $\forall x\ \forall y\ \forall z\ \forall v\ \Big[\Big[\big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \mathrm{S}(v) \wedge \mathrm{S}(z) \wedge \mathrm{SC}(x,y) \wedge \mathrm{P}(x,v) \wedge \mathrm{P}(y,v) \wedge \mathrm{Cont}(z,x) \wedge \mathrm{Cont}(z,y) \wedge \mathrm{Cover}$

58. $\forall x\ \forall y\ \forall z\ \Big[\Big[\Big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \mathrm{S}(z) \wedge \mathrm{BCont}(x,y) \wedge \mathrm{P}(y,z) \wedge \forall v\ \forall w\ \Big[\Big[\big(\mathrm{S}(v) \wedge \mathrm{S}(w) \wedge \mathrm{P}(v,z) \wedge \neg\ \big(\mathrm{PO}(v,y)$

59. $\forall x\ \forall y\ \forall z\ \Big[\Big[\big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \mathrm{S}(z) \wedge \mathrm{BCont}(x,y) \wedge \mathrm{Cont}(z,x)\big) \rightarrow \mathrm{BCont}(z,y)\Big]\Big]$

60. $\forall x\ \forall y\ \Big[\Big[\big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \mathrm{BCont}(x,y)\big) \leftrightarrow \Big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \neg\ \big(\mathrm{ZEX}(x)\big) \wedge \forall z\ \Big[\Big[\big(\mathrm{P}(z,x) \wedge \mathrm{Min}(z)\big) \rightarrow \mathrm{BCon}$

61. $\forall x\ \forall y\ \Big[\Big[\mathrm{TCont}(x,y) \leftrightarrow \Big(\mathrm{Cont}(x,y) \wedge \exists z\ \Big[\big(\mathrm{Cont}(z,x) \wedge \mathrm{BCont}(z,y)\big)\Big]\Big)\Big]\Big]$

62. $\forall x\ \forall y\ \Big[\big[\mathrm{SC}(x,y) \rightarrow \mathrm{C}(x,y)\big]\Big]$

63. $\forall x\ \forall y\ \Big[\Big[\mathrm{SC}(x,y) \rightarrow \neg\exists z\ \Big[\big(\mathrm{Cont}(z,x) \wedge \mathrm{P}(z,y)\big)\Big]\Big]\Big]$

64. $\forall x\ \forall y\ \left[\left[\mathrm{SC}(x,y) \rightarrow \neg\exists z\ \left[\left(\mathrm{P}(z,x) \wedge \mathrm{Cont}(z,y)\right)\right]\right]\right]$

65. $\forall x\ \forall y\ \left[\left[\left(\mathrm{C}(x,y) \wedge \forall z\ \left[\left(\neg\left(\mathrm{Cont}(z,x)\right) \vee \neg\left(\mathrm{Cont}(z,y)\right) \vee \left(\neg\left(\mathrm{P}(z,x)\right) \wedge \neg\left(\mathrm{P}(z,y)\right)\right)\right)\right]\right) \rightarrow \mathrm{SC}(x,y)\right.\right.$

66. $\forall x\ \left[\neg\left(\mathrm{SC}(x,x)\right)\right]$

67. $\forall x\ \forall y\ \left[\left[\mathrm{SC}(x,y) \rightarrow \mathrm{SC}(y,x)\right]\right]$

68. $\forall x\ \forall y\ \left[\left[\mathrm{SC}(x,y) \rightarrow \exists z\ \left[\left(\mathrm{lt}(z,x) \wedge \mathrm{lt}(z,y) \wedge \mathrm{Cont}(z,x) \wedge \mathrm{Cont}(z,y)\right)\right]\right]\right]$

69. $\forall x\ \forall y\ \left[\left[\mathrm{SC}(x,y) \leftrightarrow \left(\exists z\ \left[\left(\mathrm{Cont}(z,x) \wedge \mathrm{Cont}(z,y)\right)\right] \wedge \forall z\ \left[\left[\left(\mathrm{Cont}(z,x) \wedge \mathrm{Cont}(z,y)\right) \rightarrow \left(\mathrm{leq}(z,x) \wedge -\right.\right.\right.\right.\right.$

70. $\forall x\ \forall y\ \left[\left[\mathrm{EqDim}(x,y) \leftrightarrow \left(\mathrm{leq}(x,y) \wedge \mathrm{leq}(y,x)\right)\right]\right]$

71. $\forall x\ \forall y\ \left[\left[\mathrm{leq}(x,y) \rightarrow \mathrm{S}(x)\right]\right]$

72. $\forall x\ \forall y\ \left[\left[\mathrm{leq}(x,y) \rightarrow \mathrm{S}(y)\right]\right]$

73. $\forall x\ \left[\left[\mathrm{ZEX}(x) \rightarrow \mathrm{S}(x)\right]\right]$

74. $\forall x\ \left[\left[\mathrm{S}(x) \rightarrow \mathrm{leq}(x,x)\right]\right]$

75. $\forall x\ \forall y\ \forall z\ \left[\left[\left(\mathrm{leq}(x,y) \wedge \mathrm{leq}(y,z)\right) \rightarrow \mathrm{leq}(x,z)\right]\right]$

76. $\forall x\ \forall y\ \left[\left[\left(\mathrm{ZEX}(x) \wedge \mathrm{ZEX}(y)\right) \rightarrow =(x,y)\right]\right]$

77. $\forall x\ \forall y\ \left[\left[\left(\mathrm{ZEX}(x) \wedge \mathrm{S}(y)\right) \rightarrow \mathrm{leq}(x,y)\right]\right]$

78. $\forall x\ \forall y\ \left[\left[\mathrm{Cont}(x,y) \rightarrow \mathrm{leq}(x,y)\right]\right]$

79. $\exists x\ \left[\mathrm{MinDim}(x)\right]$

80. $\forall x\ \left[\left[\mathrm{MaxDim}(x) \leftrightarrow \left(\mathrm{S}(x) \wedge \neg\left(\mathrm{ZEX}(x)\right) \wedge \forall y\ \left[\left[\mathrm{S}(y) \rightarrow \mathrm{leq}(y,x)\right]\right]\right)\right]\right]$

81. $\forall x \ \left[\left[\mathrm{MinDim}(x) \leftrightarrow \left(\mathrm{S}(x) \wedge \neg \left(\mathrm{ZEX}(x)\right) \wedge \forall y \ \left[\left[\left(\mathrm{S}(y) \wedge \neg \left(\mathrm{ZEX}(y)\right)\right) \rightarrow \mathrm{leq}(x,y)\right]\right]\right)\right]\right]$

82. $\forall x \ \left[\left[\left(\mathrm{S}(x) \wedge \neg \left(\mathrm{ZEX}(x)\right)\right) \leftrightarrow \mathrm{Cont}(x,x)\right]\right]$

83. $\forall x \, \forall y \ \left[\left[\left(\mathrm{Cont}(x,y) \wedge \mathrm{Cont}(y,x)\right) \rightarrow =(x,y)\right]\right]$

84. $\forall x \, \forall y \, \forall z \ \left[\left[\left(\mathrm{Cont}(x,y) \wedge \mathrm{Cont}(y,z)\right) \rightarrow \mathrm{Cont}(x,z)\right]\right]$

85. $\forall x \, \forall y \ \left[\left[\mathrm{ZEX}(x) \rightarrow \left(\mathrm{S}(x) \wedge \neg \left(\mathrm{Cont}(y,x)\right) \wedge \neg \left(\mathrm{Cont}(x,y)\right)\right)\right]\right]$

86. $\forall x \, \forall y \ \left[\left[\left(\mathrm{ZEX}(x) \wedge \mathrm{ZEX}(y)\right) \rightarrow =(x,y)\right]\right]$

87. $\forall x \, \forall y \ \left[\left[\mathrm{P}(x,y) \leftrightarrow \left(\mathrm{Cont}(x,y) \wedge \mathrm{EqDim}(x,y)\right)\right]\right]$

88. $\forall x \, \forall y \ \left[\left[\mathrm{C}(x,y) \leftrightarrow \exists z \ \left[\left(\mathrm{Cont}(z,x) \wedge \mathrm{Cont}(z,y)\right)\right]\right]\right]$

89. $\forall x \ \left[\neg \left(\mathrm{Inc}(x,x)\right)\right]$

90. $\forall x \, \forall y \ \left[\left[\mathrm{Inc}(x,y) \rightarrow \mathrm{Inc}(y,x)\right]\right]$

91. $\forall x \, \forall y \ \left[\left[\mathrm{EqDim}(x,y) \rightarrow \neg \left(\mathrm{Inc}(x,y)\right)\right]\right]$

92. $\forall x \, \forall y \ \left[\left[\mathrm{Inc}(x,y) \rightarrow \left(\mathrm{lt}(x,y) \vee \mathrm{lt}(y,x)\right)\right]\right]$

93. $\forall x \, \forall y \ \left[\left[\left(\mathrm{Cont}(x,y) \wedge \mathrm{lt}(x,y)\right) \rightarrow \mathrm{Inc}(x,y)\right]\right]$

94. $\forall x \, \forall y \, \forall z \ \left[\left[\left(\mathrm{Inc}(x,y) \wedge \mathrm{P}(y,z)\right) \rightarrow \mathrm{Inc}(x,z)\right]\right]$

95. $\forall x \, \forall y \ \left[\left[\mathrm{Inc}(x,y) \leftrightarrow \left(\exists z \ \left[\left(\mathrm{leq}(z,x) \wedge \neg \left(\mathrm{EqDim}(z,x)\right) \wedge \mathrm{Cont}(z,x) \wedge \mathrm{P}(z,y)\right)\right] \vee \exists z \ \left[\left(\mathrm{leq}(z,y) \wedge \neg \left(\mathrm{E}\right.\right.\right.\right.$

96. $\forall x \ \Big[\Big[\Big(\mathrm{S}(x) \wedge \neg \big(\mathrm{ZEX}(x)\big)\Big) \rightarrow \mathrm{PO}(x,x)\Big]\Big]$

97. $\forall x \ \forall y \ \Big[\big[\mathrm{PO}(x,y) \rightarrow \mathrm{PO}(y,x)\big]\Big]$

98. $\forall x \ \forall y \ \Big[\big[\mathrm{PO}(x,y) \rightarrow \mathrm{EqDim}(x,y)\big]\Big]$

99. $\forall x \ \forall y \ \Big[\Big[\mathrm{PO}(x,y) \leftrightarrow \exists z \ \big[\big(\mathrm{P}(z,x) \wedge \mathrm{P}(z,y)\big)\big]\Big]\Big]$

100. $\forall x \ \Big[\Big[\mathrm{Max}(x) \leftrightarrow \Big(\mathrm{S}(x) \wedge \neg \big(\mathrm{ZEX}(x)\big) \wedge \forall y \ \big[\neg \big(\mathrm{PP}(x,y)\big)\big]\Big)\Big]\Big]$

101. $\forall x \ \Big[\Big[\mathrm{Min}(x) \leftrightarrow \Big(\mathrm{S}(x) \wedge \neg \big(\mathrm{ZEX}(x)\big) \wedge \forall y \ \big[\neg \big(\mathrm{PP}(y,x)\big)\big]\Big)\Big]\Big]$

102. $\forall x \ \forall y \ \Big[\Big[\mathrm{PP}(x,y) \leftrightarrow \Big(\mathrm{P}(x,y) \wedge \neg \big(=(x,y)\big)\Big)\Big]\Big]$

103. $\forall x \ \forall y \ \Big[\Big[\mathrm{BCont}(x,y) \rightarrow \Big(\mathrm{Cont}(x,y) \wedge \neg \big(\mathrm{EqDim}(x,y)\big)\Big)\Big]\Big]$

104. $\forall x \ \forall y \ \forall v \ \forall z \ \Big[\Big[\big(\mathrm{SC}(x,y) \wedge \mathrm{Min}(x) \wedge \mathrm{P}(x,v) \wedge \mathrm{Cont}(y,v) \wedge \mathrm{Cont}(z,x) \wedge \mathrm{Cont}(z,y)\big) \rightarrow \mathrm{BCont}(z,x)\Big]\Big]$

105. $\forall x \ \forall y \ \forall z \ \forall v \ \Big[\Big[\big(\mathrm{SC}(x,y) \wedge \mathrm{P}(x,v) \wedge \mathrm{P}(y,v) \wedge \mathrm{Cont}(z,x) \wedge \mathrm{Cont}(z,y) \wedge \mathrm{Covers}(v,z)\big) \rightarrow \neg \big(\mathrm{BCont}(z,v)\big)\Big]$

106. $\forall x \ \forall y \ \forall z \ \Big[\Big[\Big(\mathrm{BCont}(x,y) \wedge \mathrm{P}(y,z) \wedge \forall v \ \forall w \ \Big[\Big[\Big(\mathrm{P}(v,z) \wedge \neg \big(\mathrm{PO}(v,y)\big) \wedge \mathrm{P}(w,x)\Big) \rightarrow \neg \big(\mathrm{Cont}(w,v)\big)\Big]\Big]\Big)$

107. $\forall x \ \forall y \ \forall z \ \Big[\Big[\big(\mathrm{BCont}(x,y) \wedge \mathrm{Cont}(z,x)\big) \rightarrow \mathrm{BCont}(z,y)\big]\Big]$

108. $\forall x \ \forall y \ \Big[\Big[\mathrm{Covers}(x,y) \leftrightarrow \Big(\mathrm{lt}(y,x) \wedge \forall z \ \Big[\Big[\mathrm{S}(z) \rightarrow \neg \big(\mathrm{lt}(y,z) \wedge \mathrm{lt}(z,x)\big)\Big]\Big]\Big)\Big]\Big]$

109. $\forall x \ \forall y \ \Big[\big[\mathrm{gt}(x,y) \leftrightarrow \mathrm{lt}(y,x)\big]\Big]$

110. $\forall x \ \forall y \ \Big[\big[\mathrm{geq}(x,y) \leftrightarrow \mathrm{leq}(y,x)\big]\Big]$

111. $\forall x\ \forall y\ \Big[\Big[\mathrm{lt}(x,y) \leftrightarrow \Big(\mathrm{leq}(x,y) \wedge \neg\ \big(\mathrm{EqDim}(x,y)\big)\Big)\Big]\Big]$

112. $\forall x\ \forall y\ \Big[\Big[\mathrm{ICont}(x,y) \leftrightarrow \Big(\mathrm{Cont}(x,y) \wedge \forall z\ \Big[\Big[\mathrm{Cont}(z,x) \rightarrow \neg\ \big(\mathrm{BCont}(z,y)\big)\Big]\Big]\Big)\Big]\Big]$

113. $\forall x\ \Big[\Big[\mathrm{Closed}(x) \leftrightarrow \forall y\ \Big[\neg\ \big(\mathrm{BCont}(y,x)\big)\Big]\Big]\Big]$

114. $\forall x\ \forall y\ \Big[\Big[\Big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \neg\ \big(\mathrm{C}(x,y)\big)\Big) \leftrightarrow \mathrm{ZEX}(\mathrm{intersection}(x,y))\Big]\Big]$

115. $\forall x\ \forall y\ \Big[\Big[\Big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \neg\ \big(\mathrm{ZEX}(\mathrm{intersection}(x,y))\big)\Big) \rightarrow \mathrm{Cont}(\mathrm{intersection}(x,y),x)\Big]\Big]$

116. $\forall x\ \forall y\ \forall z\ \Big[\Big[\big(\mathrm{Cont}(z,x) \wedge \mathrm{Cont}(z,y)\big) \rightarrow \mathrm{leq}(z,\mathrm{intersection}(x,y))\Big]\Big]$

117. $\forall x\ \forall y\ \forall z\ \Big[\Big[\big(\mathrm{Cont}(z,x) \wedge \mathrm{Cont}(z,y) \wedge \mathrm{EqDim}(z,\mathrm{intersection}(x,y))\big) \leftrightarrow \mathrm{P}(z,\mathrm{intersection}(x,y))\Big]\Big]$

118. $\forall x\ \forall y\ \Big[\Big[\Big(\mathrm{S}(x) \wedge \mathrm{S}(y) \wedge \neg\ \big(\mathrm{ZEX}(\mathrm{difference}(x,y))\big)\Big) \rightarrow \mathrm{EqDim}(x,\mathrm{difference}(x,y))\Big]\Big]$

119. $\forall x\ \forall y\ \Big[\big[\mathrm{lt}(y,x) \rightarrow =\!(x,\mathrm{difference}(x,y))\big]\Big]$

120. $\forall x\ \forall y\ \forall z\ \Big[\Big[\big(\mathrm{leq}(x,y) \wedge \mathrm{Cont}(z,x) \wedge \mathrm{lt}(\mathrm{intersection}(z,y),z)\big) \rightarrow \mathrm{Cont}(z,\mathrm{difference}(x,y))\Big]\Big]$

121. $\forall x\ \forall y\ \forall z\ \Big[\Big[\big(\mathrm{leq}(x,y) \wedge \mathrm{Cont}(z,\mathrm{difference}(x,y))\big) \rightarrow \mathrm{Cont}(z,x)\Big]\Big]$

122. $\forall x\ \forall y\ \forall z\ \Big[\Big[\big(\mathrm{leq}(x,y) \wedge \mathrm{P}(z,\mathrm{difference}(x,y))\big) \rightarrow \mathrm{lt}(\mathrm{intersection}(z,y),z)\Big]\Big]$

123. $\forall x\ \forall y\ \Big[\Big[\mathrm{ZEX}(\mathrm{difference}(x,y)) \leftrightarrow \big(\mathrm{ZEX}(x) \vee \mathrm{Cont}(x,y)\big)\Big]\Big]$

124. $\forall x\ \Big[\Big(\neg\ \big(\mathrm{PED}(x)\big) \vee \neg\ \big(\mathrm{S}(x)\big)\Big)\Big]$

125. $\forall x\ \big[\mathrm{S}(\mathrm{r}(x))\big]$

126. $\forall x\ \Big[\big[\mathrm{S}(x) \leftrightarrow =\!(x,\mathrm{r}(x))\big]\Big]$

127. $\forall x\ \forall y\ \Big[\Big[\mathrm{Cont}(x,y) \rightarrow \big(\mathrm{S}(x) \wedge \mathrm{S}(y)\big)\Big]\Big]$

128. $\forall x\ \forall y\ \Big[\Big[\mathrm{lt}(x,y) \rightarrow \big(\mathrm{S}(x) \wedge \mathrm{S}(y)\big)\Big]\Big]$

129. $\forall x\ \Big[\big[\mathrm{ZEX}(x) \rightarrow \mathrm{S}(x)\big]\Big]$

130. $\forall x\ \forall y\ \Big[\Big[\mathrm{BCont}(x,y) \rightarrow \big(\mathrm{S}(x) \wedge \mathrm{S}(y)\big)\Big]\Big]$

131. $\forall x\ \Big[\big[\mathrm{PED}(x) \rightarrow \mathrm{MaxDim}(\mathrm{r}(x))\big]\Big]$

132. $\forall x\ \forall y\ \Big[\Big[\mathrm{hosts}(x,y) \rightarrow \big[\mathrm{RPF}(y) \leftrightarrow \mathrm{P}(\mathrm{r}(y),\mathrm{r}(x))\big]\Big]\Big]$

133. $\forall x\ \forall y\ \Big[\Big[\mathrm{hosts}(x,y) \rightarrow \Big[\mathrm{DPF}(y) \leftrightarrow \neg\ \big(\mathrm{PO}(\mathrm{r}(x),\mathrm{r}(y))\big)\Big]\Big]\Big]$

134. $\forall x\ \Big[\Big[\mathrm{ICon}(x) \leftrightarrow \Big(\mathrm{Con}(x) \wedge \forall y\ \Big[\big[\mathrm{PP}(y,x) \rightarrow \mathrm{Covers}(x,\mathrm{intersection}(y,\mathrm{difference}(x,y)))\big]\Big]\Big)\Big]\Big]$

135. $\forall x\ \Big[\Big[\mathrm{Con}(x) \leftrightarrow \Big(\mathrm{S}(x) \wedge \forall y\ \Big[\big[\mathrm{PP}(y,x) \rightarrow \mathrm{SC}(y,\mathrm{difference}(x,y))\big]\Big]\Big)\Big]\Big]$

136. $\forall v\ \forall o\ \Big[\Big[\mathrm{PO}(v,\mathrm{porespace}(o)) \leftrightarrow \exists m\ \Big[\Big(\mathrm{DK1}(m,o) \wedge \forall u\ \Big[\Big[\mathrm{hostsv}(o,u) \rightarrow \neg\ \big(\mathrm{PO}(v,\mathrm{r}(u))\big)\Big]\Big] \wedge \exists u\ \Big[\big(\mathrm{hos}$

137. $\forall v\ \forall o\ \Big[\Big[\mathrm{PO}(v,\mathrm{voidspace}(o)) \leftrightarrow \Big(\mathrm{PO}(v,\mathrm{porespace}(o)) \vee \exists u\ \Big[\big(\mathrm{hostsv}(o,u) \wedge \mathrm{PO}(v,\mathrm{r}(u))\big)\Big]\Big)\Big]\Big]$

138. $\forall o\ \Big[\Big[\neg\ \big(\mathrm{ZEX}(\mathrm{porespace}(o))\big) \rightarrow \exists v\ \exists m\ \Big[\big(=(\mathrm{r}(v),\mathrm{porespace}(o)) \wedge \mathrm{hostsv}(m,v) \wedge \mathrm{DK1}(m,o)\big)\Big]\Big]\Big]$

139. $\forall o\ \Big[\Big[\neg\ \big(\mathrm{ZEX}(\mathrm{voidspace}(o))\big) \rightarrow \exists v\ \exists m\ \Big[\big(=(\mathrm{r}(v),\mathrm{voidspace}(o)) \wedge \mathrm{hostsv}(m,v) \wedge \mathrm{DK1}(m,o)\big)\Big]\Big]\Big]$

140. $\forall v\ \forall o\ \Big[\Big[\mathrm{PO}(v,\mathrm{convoidspace}(o)) \leftrightarrow \exists u\ \Big[\big(\mathrm{PO}(v,u) \wedge \mathrm{ICon}(u) \wedge \mathrm{Cont}(u,\mathrm{voidspace}(o)) \wedge \mathrm{StrongC}(u,\mathrm{differe}$

141. $\forall v\ \forall o\ \Big[\Big[\mathrm{PO}(v,\mathrm{conporespace}(o)) \leftrightarrow \exists u\ \Big[\big(\mathrm{PO}(v,u) \wedge \mathrm{ICon}(u) \wedge \mathrm{Cont}(u,\mathrm{porespace}(o)) \wedge \mathrm{StrongC}(u,\mathrm{differ}$

142. $\forall x \ \Big[\Big(\neg \big(\mathrm{PED}(x)\big) \vee \neg \big(\mathrm{S}(x)\big)\Big)\Big]$

143. $\forall x \ \big[\mathrm{S}(\mathrm{r}(x))\big]$

144. $\forall x \ \Big[\big[\mathrm{S}(x) \leftrightarrow =(x, \mathrm{r}(x))\big]\Big]$

145. $\forall x \ \forall y \ \Big[\Big[\mathrm{Cont}(x, y) \rightarrow \big(\mathrm{S}(x) \wedge \mathrm{S}(y)\big)\Big]\Big]$

146. $\forall x \ \forall y \ \Big[\Big[\mathrm{lt}(x, y) \rightarrow \big(\mathrm{S}(x) \wedge \mathrm{S}(y)\big)\Big]\Big]$

147. $\forall x \ \Big[\big[\mathrm{ZEX}(x) \rightarrow \mathrm{S}(x)\big]\Big]$

148. $\forall x \ \forall y \ \Big[\Big[\mathrm{BCont}(x, y) \rightarrow \big(\mathrm{S}(x) \wedge \mathrm{S}(y)\big)\Big]\Big]$

149. $\forall x \ \Big[\big[\mathrm{PED}(x) \rightarrow \mathrm{MaxDim}(\mathrm{r}(x))\big]\Big]$

150. $\forall x \ \forall y \ \Big[\big[\mathrm{DK1}(x, y) \rightarrow \mathrm{P}(\mathrm{r}(x), \mathrm{r}(y))\big]\Big]$

151. $\forall x \ \forall y \ \Big[\Big[\mathrm{hosts}(x, y) \rightarrow \big[\mathrm{RPF}(y) \leftrightarrow \mathrm{P}(\mathrm{r}(y), \mathrm{r}(x))\big]\Big]\Big]$

152. $\forall x \ \forall y \ \forall m \ \forall n \ \Big[\Big[\big(\mathrm{hosts}(x, y) \wedge \mathrm{RPF}(y) \wedge \mathrm{DK1}(m, x) \wedge \mathrm{DK1}(n, y)\big) \rightarrow \mathrm{P}(\mathrm{r}(n), \mathrm{r}(m))\Big]\Big]$

153. $\forall x \ \forall y \ \Big[\Big[\mathrm{hosts}(x, y) \rightarrow \Big[\mathrm{DPF}(y) \leftrightarrow \neg \big(\mathrm{PO}(\mathrm{r}(x), \mathrm{r}(y))\big)\Big]\Big]\Big]$

154. $\forall x \ \forall y \ \Big[\big[\mathrm{DK1}(x, y) \rightarrow \mathrm{M}(x)\big]\Big]$

155. $\forall x \ \forall y \ \Big[\Big[\mathrm{DK1}(x, y) \rightarrow \big(\mathrm{POB}(y) \vee \mathrm{RPF}(y)\big)\Big]\Big]$

156. $\forall x \ \forall y \ \forall z \ \Big[\Big[\big(\mathrm{DK1}(x, y) \wedge \mathrm{DK1}(z, y)\big) \rightarrow =(x, z)\Big]\Big]$

157. $\forall y \ \Big[\Big[\big(\mathrm{POB}(y) \vee \mathrm{RPF}(y)\big) \rightarrow \exists x \ \big[\mathrm{DK1}(x, y)\big]\Big]\Big]$

158. $\forall x \ \forall v \ \Big[\big[\mathrm{hostsv}(x, v) \rightarrow =(\mathrm{op}(x, v), \mathrm{intersection}(\mathrm{r}(v), \mathrm{difference}(CUni, \mathrm{sum}(\mathrm{r}(x), \mathrm{r}(v)))))\big]\Big]$

159. $\forall x \ \forall y \ \big[=(\mathrm{sum}(x, y), \mathrm{sum}(y, x))\big]$

160. $\forall x \ \forall y \ \Big[\big[\mathrm{lt}(x, y) \rightarrow =(y, \mathrm{sum}(x, y))\big]\Big]$

161. $\forall x\ \forall y\ \forall z\ \Big[\Big[\big(\mathrm{leq}(x,y) \wedge \mathrm{Cont}(z,y)\big) \rightarrow \mathrm{Cont}(z,\mathrm{sum}(x,y))\Big]\Big]$

162. $\forall x\ \forall y\ \forall z\ \Big[\Big[\Big(\mathrm{Cont}(z,\mathrm{sum}(x,y)) \wedge \neg\ \big(\mathrm{Cont}(z,x)\big)\Big) \rightarrow \mathrm{Cont}(\mathrm{difference}(z,x),y)\Big]\Big]$

163. $\forall x\ \forall y\ \Big[\Big[\mathrm{surroundsvoid}(y,x) \leftrightarrow \big(\mathrm{surrounds}(y,x) \wedge \mathrm{V}(x)\big)\Big]\Big]$

164. $\forall x\ \forall y\ \Big[\Big[\mathrm{surrounds}(y,x) \leftrightarrow \big(\mathrm{detcont}(y,x) \wedge \mathrm{mat}(y)\big)\Big]\Big]$

165. $\forall x\ \forall y\ \Big[\Big[\mathrm{detcont}(y,x) \leftrightarrow \Big(\mathrm{fullphyscont}(y,x) \wedge \neg\ \big(\mathrm{matdep}(y,x)\big)\Big)\Big]\Big]$

166. $\forall x\ \forall y\ \Big[\big[\mathrm{matdep}(x,y) \rightarrow \mathrm{dep}(x,y)\big]\Big]$

167. $\forall x\ \forall y\ \Big[\Big[\mathrm{matdep}(x,y) \rightarrow \big(\mathrm{mat}(x) \vee \mathrm{V}(x)\big)\Big]\Big]$

168. $\forall x\ \forall y\ \Big[\Big[\mathrm{matdep}(x,y) \rightarrow \big(\mathrm{mat}(y) \vee \mathrm{V}(y)\big)\Big]\Big]$

169. $\forall x\ \forall y\ \Big[\Big[\big(\mathrm{matdep}(x,y) \wedge \mathrm{V}(x) \wedge \mathrm{mat}(y)\big) \rightarrow \Big(\mathrm{PO}(\mathrm{r}(x),\mathrm{r}(y)) \vee \exists v\ \Big[\big(\mathrm{hostsv}(y,v) \wedge \mathrm{PO}(\mathrm{r}(x),\mathrm{r}(v))\big)\Big]\Big)\Big]\Big]$

170. $\forall x\ \forall y\ \Big[\Big[\big(\mathrm{matdep}(x,y) \wedge \mathrm{V}(x) \wedge \mathrm{V}(y)\big) \rightarrow \mathrm{PO}(\mathrm{r}(x),\mathrm{r}(y))\Big]\Big]$

171. $\forall x\ \forall y\ \Big[\Big[\mathrm{matdep}(x,y) \rightarrow \big(\mathrm{PO}(\mathrm{r}(x),\mathrm{r}(y)) \vee \mathrm{StrongC}(\mathrm{r}(x),\mathrm{r}(y))\big)\Big]\Big]$

172. $\forall x\ \forall y\ \Big[\Big[\big(\mathrm{matdep}(x,y) \wedge \mathrm{mat}(x) \wedge \mathrm{mat}(y)\big) \rightarrow \mathrm{PO}(\mathrm{r}(x),\mathrm{r}(y))\Big]\Big]$

173. $\forall x\ \forall y\ \Big[\Big[\big(\mathrm{mat}(x) \wedge \mathrm{V}(y)\big) \rightarrow \Big[\mathrm{matdep}(x,y) \leftrightarrow \exists z\ \exists hy\ \Big[\Big(\mathrm{submat}(z,x) \wedge \mathrm{submat}(z,hy) \wedge \mathrm{hostsv}(hy,y) \wedge$

174. $\forall x\ \forall y\ \Big[\Big[\big(\mathrm{V}(x) \wedge \mathrm{V}(y)\big) \rightarrow \Big[\mathrm{matdep}(x,y) \leftrightarrow \Big(\mathrm{PO}(\mathrm{r}(x),\mathrm{r}(y)) \wedge \exists hx\ \exists hy\ \exists z\ \Big[\big(\mathrm{hostsv}(hx,x) \wedge \mathrm{hostsv}(hy,$

175. $\forall x\ \forall y\ \Big[\Big[\mathrm{StrongC}(x,y) \leftrightarrow \big(\mathrm{SC}(x,y) \wedge \mathrm{EqDim}(x,y) \wedge \mathrm{Covers}(x,\mathrm{intersection}(x,y))\big)\Big]\Big]$

176. $\forall x\ \forall y\ \Big[\big[\mathrm{dep}(x,y) \rightarrow \mathrm{PED}(x)\big]\Big]$

177. $\forall x\ \forall y\ \Big[\big[\mathrm{dep}(x,y) \rightarrow \mathrm{PED}(y)\big]\Big]$

178. $\forall x\ \forall y\ \Big[\big[\mathrm{dep}(x,y) \rightarrow \mathrm{dep}(y,x)\big]\Big]$

179. $\forall x\ \forall y\ \Big[\Big[\big(\mathrm{mat}(x) \wedge \mathrm{mat}(y)\big) \rightarrow \big[\mathrm{dep}(x,y) \leftrightarrow \mathrm{PO}(\mathrm{r}(x),\mathrm{r}(y))\big]\Big]\Big]$

180. $\forall x\ \forall y\ \Big[\Big[\big(\mathrm{V}(x) \wedge \mathrm{mat}(y)\big) \rightarrow \big[\mathrm{dep}(y,x) \leftrightarrow \mathrm{hostsvany}(y,x)\big]\Big]\Big]$

181. $\forall x\ \forall y\ \Big[\Big[\big(\mathrm{V}(x) \wedge \mathrm{V}(y)\big) \rightarrow \Big[\mathrm{dep}(x,y) \leftrightarrow \Big(\mathrm{PO}(\mathrm{r}(x),\mathrm{r}(y)) \wedge \exists hx\ \exists hy\ \Big[\big(\mathrm{hostsv}(hx,x) \wedge \mathrm{hostsv}(hy,y) \wedge \mathrm{m}$

182. $\forall x\ \Big[\big[\mathrm{PED}(x) \rightarrow \mathrm{dep}(x,x)\big]\Big]$

183. $\forall x\ \forall y\ \Big[\Big[\mathrm{fullphyscont}(y,x) \leftrightarrow \Big(\mathrm{PED}(x) \wedge \mathrm{PED}(y) \wedge \mathrm{P}(\mathrm{r}(x),\mathrm{ch}(y)) \wedge \Big[\neg\big(\mathrm{mat}(y)\big) \rightarrow \mathrm{P}(\mathrm{r}(x),\mathrm{r}(y))\Big]\Big)\Big]\Big]$

184. $\forall x\ \forall y\ \Big[\Big[\mathrm{enclosesvoid}(y,x) \leftrightarrow \Big(\mathrm{surroundsvoid}(y,x) \wedge \exists v\ \Big[\big(\mathrm{hostsvany}(y,v) \wedge \mathrm{hostscavity}(y,v) \wedge \mathrm{P}(\mathrm{r}(x),\mathrm{r}$

185. $\forall x\ \forall y\ \Big[\Big[\mathrm{hostsh}(x,y) \leftrightarrow \big(\mathrm{hostsv}(x,y) \wedge \mathrm{ICon}(\mathrm{r}(x))\big)\Big]\Big]$

186. $\forall x\ \forall y\ \Big[\Big[\mathrm{hostsg}(x,y) \leftrightarrow \Big(\mathrm{hostsv}(x,y) \wedge \neg\big(\mathrm{ICon}(\mathrm{r}(x))\big)\Big)\Big]\Big]$

187. $\forall y\ \Big[\Big[\mathrm{Hole}(y) \leftrightarrow \exists x\ \big[\mathrm{hostsh}(x,y)\big]\Big]\Big]$

188. $\forall y\ \Big[\Big[\mathrm{Gap}(y) \leftrightarrow \exists x\ \big[\mathrm{hostsg}(x,y)\big]\Big]\Big]$

189. $\forall x\ \forall y\ \Big[\Big[\mathrm{hostscavity}(x,y) \leftrightarrow \Big(\mathrm{hostsv}(x,y) \wedge \neg\big(\mathrm{Covers}(\mathrm{r}(x),\mathrm{op}(x,y))\big)\Big)\Big]\Big]$

190. $\forall y\ \Big[\Big[\mathrm{CAVITY}(y) \leftrightarrow \exists x\ \big[\mathrm{hostscavity}(x,y)\big]\Big]\Big]$

191. $\forall x\ \forall y\ \Big[\Big[\mathrm{hostscavityi}(x,y) \leftrightarrow \big(\mathrm{hostscavity}(x,y) \wedge \mathrm{ZEX}(\mathrm{op}(x,y))\big)\Big]\Big]$

192. $\forall x\ \forall y\ \Big[\Big[\text{hostscavityt}(x,y) \leftrightarrow \big(\text{hostscavity}(x,y) \wedge \neg\ \big(\text{ZEX}(\text{op}(x,y))\big)\big)\Big]\Big]$

193. $\forall x\ \forall y\ \Big[\Big[\text{hostshollow}(x,y) \leftrightarrow \big(\text{hostsv}(x,y) \wedge \text{Covers}(\text{r}(x),\text{op}(x,y)) \wedge \text{ICon}(\text{op}(x,y))\big)\Big]\Big]$

194. $\forall y\ \Big[\Big[\text{HOL}(y) \leftrightarrow \exists x\ \ \big[\text{hostshollow}(x,y)\big]\Big]\Big]$

195. $\forall x\ \forall y\ \Big[\Big[\text{hoststunnel}(x,y) \leftrightarrow \big(\text{hostsv}(x,y) \wedge \text{Covers}(\text{r}(x),\text{op}(x,y)) \wedge \neg\ \big(\text{ICon}(\text{op}(x,y))\big)\big)\Big]\Big]$

196. $\forall y\ \Big[\Big[\text{TUN}(y) \leftrightarrow \exists x\ \ \big[\text{hoststunnel}(x,y)\big]\Big]\Big]$

197. $\forall x\ \forall y\ \Big[\Big[\text{hostsve}(x,y) \leftrightarrow \Big(\text{hostsv}(x,y) \wedge \exists z\ \ \Big[\Big(\text{P}(z,\text{op}(x,y)) \wedge \forall u\ \ \Big[\big[\big(\text{hostsv}(x,u) \wedge \text{EqDim}(\text{intersectio}$

198. $\forall x\ \forall y\ \Big[\Big[\text{hostsvi}(x,y) \leftrightarrow \big(\text{hostsv}(x,y) \wedge \neg\ \big(\text{hostsve}(x,y)\big)\big)\Big]\Big]$

199. $\forall x\ \forall y\ \Big[\Big[\text{osurroundsmat}(y,x) \leftrightarrow \big(\text{surroundsmat}(y,x) \wedge \neg\ \big(\text{enclosesmat}(y,x)\big) \wedge \neg\ \big(\text{isurroundsmat}(y,x)\big)\big)$

200. $\forall x\ \forall y\ \Big[\Big[\text{isurroundsmat}(y,x) \leftrightarrow \big(\text{surroundsmat}(y,x) \wedge \neg\ \big(\text{P}(\text{r}(x),\text{voidspaceall}(y))\big)\big)\Big]\Big]$

201. $\forall x\ \forall y\ \Big[\Big[\text{surroundsmat}(y,x) \leftrightarrow \big(\text{surrounds}(y,x) \wedge \text{mat}(x)\big)\Big]\Big]$

202. $\forall x\ \forall y\ \Big[\Big[\text{enclosesmat}(y,x) \leftrightarrow \Big(\text{surroundsmat}(y,x) \wedge \exists v\ \ \Big[\big(\text{hostsvany}(y,v) \wedge \text{hostscavity}(y,v) \wedge \text{P}(\text{r}(x),\text{r}$

203. $\forall x\ \forall y\ \Big[\Big[\text{voidinside}(x,y) \leftrightarrow \big(\text{inside}(x,y) \wedge \text{V}(x)\big)\Big]\Big]$

204. $\forall x\ \forall y\ \Big[\Big[\text{inside}(x,y) \leftrightarrow \big(\text{detcont}(y,x) \wedge \text{V}(y)\big)\Big]\Big]$

205. $\forall x\ \forall y\ \Big[\Big[\text{matfillsinside}(x,y) \leftrightarrow \big(\text{matinside}(x,y) \wedge =(\text{r}(x),\text{r}(y))\big)\Big]\Big]$

206. $\forall x\ \forall y\ \Big[\Big[\text{matinside}(x,y) \leftrightarrow \big(\text{inside}(x,y) \wedge \text{mat}(x)\big)\Big]\Big]$

207. $\forall x\ \forall y\ \Big[\Big[\text{matsplitinside}(x,y) \leftrightarrow \Big(\text{matinside}(x,y) \wedge \text{PP}(\text{r}(x),\text{r}(y)) \wedge \text{ICon}(\text{r}(y)) \wedge \neg\ \big(\text{ICon}(\text{difference}(\text{r}(y),$

208. $\forall x\ \forall y\ \Big[\Big[\text{depimmatcontains}(y,x) \leftrightarrow \big(\text{depcont}(y,x) \wedge \text{V}(y)\big)\Big]\Big]$

209. $\forall x\ \forall y\ \Big[\Big[\text{depcont}(y,x) \leftrightarrow \big(\text{fullphyscont}(y,x) \wedge \text{matdep}(y,x)\big)\Big]\Big]$

210. $\forall x\ \forall y\ \Big[\Big[\text{depmatcont}(y,x) \leftrightarrow \big(\text{depcont}(y,x) \wedge \text{mat}(y)\big)\Big]\Big]$

211. $\forall x\ \forall y\ \Big[\Big[\text{subvoid}(x,y) \leftrightarrow \Big(\text{immatcont}(y,x) \wedge \exists h\ \Big[\big(\text{hostsv}(h,y) \wedge \text{hostsv}(h,x)\big)\Big]\Big)\Big]\Big]$

212. $\forall x\ \forall y\ \Big[\Big[\text{immatcont}(y,x) \leftrightarrow \big(\text{depcont}(y,x) \wedge \text{V}(x) \wedge \text{V}(y)\big)\Big]\Big]$

213. $\forall x\ \forall y\ \Big[\Big[\text{submaterial}(x,y) \leftrightarrow \big(\text{matcont}(y,x) \wedge \text{P}(\text{r}(x),\text{r}(y))\big)\Big]\Big]$

214. $\forall x\ \forall y\ \Big[\Big[\text{matcont}(y,x) \leftrightarrow \big(\text{depcont}(y,x) \wedge \text{mat}(x) \wedge \text{mat}(y)\big)\Big]\Big]$