

$$CO \quad DTIME(2^n) \not\subseteq DTIME(n2^n)$$

BEW.: INDIREKT

$$DTIME(n2^n) \subseteq DTIME(2^n)$$

$$\Rightarrow DTIME(2^n 2^{2^n}) \subseteq DTIME(2^{2^n})$$

$$f_1(n) = n2^n, f_2(n) = 2^n, g(n) = 2^n$$

$$\wedge DTIME((n+2^n)2^n 2^{2^n}) \subseteq DTIME(2^n 2^{2^n})$$

$$g(n) = n + 2^n$$

$$\Rightarrow DTIME((n+2^n)2^n 2^{2^n}) \subseteq DTIME(2^{2^n})$$

$$ABER \quad \inf_{n \rightarrow \infty} \frac{2^{2^n} \log 2^{2^n}}{(n+2^n)2^n 2^{2^n}} = \inf_{n \rightarrow \infty} \frac{1}{n+2^n} = 0$$

$$\Rightarrow DTIME(2^{2^n}) \not\subseteq DTIME((n+2^n)2^n 2^{2^n})$$

$$CO \quad NSPACE(n^3) \not\subseteq NSPACE(n^4)$$

BEW.: INDIREKT

$$NSPACE(n^4) \subseteq NSPACE(n^3)$$

$$\Rightarrow NSPACE(n^n) \subseteq NSPACE(n^9) \quad g(n) = n^3$$

$$\wedge NSPACE(n^{16}) \subseteq NSPACE(n^{12}) \quad g(n) = n^4$$

$$\wedge NSPACE(n^{20}) \subseteq NSPACE(n^{15}) \quad g(n) = n^5$$

$$\Rightarrow NSPACE(n^{20}) \subseteq NSPACE(n^9)$$

$$ABER \quad NSPACE(n^9) \subseteq DSPACE(n^{18})$$

$$DSPACE(n^{18}) \not\subseteq DSPACE(n^{20})$$

$$\inf_{n \rightarrow \infty} \frac{n^{18}}{n^{20}} = 0$$

$$\Rightarrow NSPACE(n^{20}) \subseteq DSPACE(n^{18})$$

$$\not\subseteq DSPACE(n^{20})$$

$$\subseteq NSPACE(n^{20})$$