Felix Hausdorff 1868 – 1942 (died 26.01.1942)

– 1910 Leipzig ; 1910 – 1913 Bonn , 1913 – 1921 Greifswald
1921 – Bonn

~ 42 publications in maths. (of which ~12 in analysis)
+ Grundzüge 1914 + Mengenlehre 1927, 1935 + several (4) vols. essay
poetry, drama etc. 1897 – 1910 under the name Paul Mongré

~ 26'000 pages Nachlass (Findbuch)

1+8 vols. collected works: I. General, set theory ✓ II Grundzüge 2002 III Mengenlehre + desc. set theory
Brieskorn, Hirzebruch, Remmert, Purkert, Scholz
✓ IV Analysis, alg., no.th. V. Astronom. optics, prob. VI Geometry etc. ✓ VII + VIII literary
2004? Raum Zeit Phil. Werk 2004
C; Remmert, Scharlau
IX Korrespondenz

Baker – Campbell–H. formula 1906

H. spaces, H. paradox
H. max. principle, H. distance } 1914 Grundzüge
H. measures, dimension 1919 Toeplitz – Hausdorff thm. 1919
H. summability 1921, H. moment problem 1923
H.–Young inequality 1923.

First 4 papers on astronomy & optics 1891–96, doct. with H. Bruns (1848–1919)
Begins with set theory ~ 1901.

$$I = \int_{-\infty}^{\infty} \frac{\sin(x-\beta)\cdot\sin(x-\gamma)}{(x-\beta)(x-\gamma)}\,dx = \pi\,\frac{\sin(\gamma-\beta)}{(\gamma-\beta)}$$

Borel 1871 – 1956
Baire 1874 – 1932
Lebesgue 1875 – 1941
Banach 1892 – 1945
Tarski 1901 – 1983
Klein 1849 – 1925
Hilbert 1862 – 1943
Cantor 1845 – 1918
Fréchet 1878 – 1973
F. Riesz 1880 – 1956
Weyl 1885 – 1955
Lindeberg (1876 – 1932)

"Aus dem Paradies, das Cantor uns geschaffen, soll uns niemand vertreiben können."
Hilbert 1925

"Je me détourne avec effroi et horreur de cette plaie lamentable des fonctions qui n'ont pas de dérivées" Hermite à Stieltjes.

"prinzipiell ganz unklar" Hausdorff 1923

Bismarck (1815 – 1898, 1871)
Wilhelm II (1859 – 1941)
Hitler (1889 – 1945)

Band VII (2004) Philosophisches Werk Paul Mongré (Pseudonym)

1897 Sant'Ilario Gedanken aus der Landschaft Zarathustras
~ 379 S.

1898 Das Chaos in kosmischer Auslese – Ein erkenntniskritischer Versuch.
~ 213 S.

Essays zu Nietzsche

(Ed. Werner Stegmaier)
Phil. Inst. Greifswald

Deutsche Forschungsgemeinschaft
Akademie der Wissenschaften
Nordrhein-Westfalen

Band VIII Literarisches Werk

1900 Ekstasen (Gedichtband)
~ 216 S

1904 Theaterstücke
Belletristik

BCH formula $e^x e^y = e^z$

$$z = x + y + \frac{1}{2}[x,y] + \frac{1}{12}[[x,y],y] + \frac{1}{12}[[y,x],x] + \cdots$$

T-H thm.

$$W(T) = \{ \langle Tz, z \rangle : z \in \mathbb{C}^n, \|z\| = 1 \}$$ convex, comp. in $\mathbb{C}$

$$\langle a, b \rangle = \sum_{j=1}^{n} a_j \overline{b_j}$$

$$\|a\| = \sqrt{\langle a, a \rangle}$$

H.-Y. inequality

$$\|\hat{f}\|_{p'} \leq \|f\|_p \qquad 1 \leq p \leq 2$$ (Chatterji, Ens. Math. 46 (2000))

SDC Math. Semesterberichte 2002 (Vol. 49)

Scholz EMS Newsletter (March 2005)

1914 $S = A \cup B \cup C \cup D$ (disjoint), D den., $A \sim B \sim C \sim (B \cup C)$

Banach 1923, Banach-Tarski 1924; Neumann 1929 amenable groups (other work on measure theory if time permits)

1919 $\lambda : [0,\infty[\to [0,\infty[$, $\lambda \uparrow$, $\lambda(0+) = 0$

$$\mathcal{L}^\lambda(A) = \lim_{\varepsilon \downarrow 0} \inf \left\{ \sum_{n=1}^{\infty} \lambda(d_n) : d_n = \operatorname{diam}(A_n),\ \bigcup_n A_n \supset A,\ A_n \text{ open ball},\ d_n < \varepsilon \right\}$$

A has dim. $[\lambda]$ if $0 < \mathcal{L}^\lambda(A) < \infty$.

If λ conts, concave, $\frac{\lambda(x)}{x} \to \infty$ ($\lambda(x) = x^p$, $0<p<1$) then $\exists\, A \subset \mathbb{R}$, $\dim A = [\lambda]$. Dvoretzky 1948 $\liminf_{x \to 0+} \frac{\lambda(x)}{x^\nu} > 0 \Rightarrow \exists\, A \subset \mathbb{R}^\nu$ ($=\infty$ case imp.)

Rogers 1998 general λ $\lambda(x) = e^{-1/x}$, $\frac{\lambda(x)}{x^\nu} \to 0\ \forall \nu$. Cantor set has dim $\frac{\log 2}{\log 3} = 0.63\ldots$

$$\alpha = \sup\{p>0 : \mathcal{L}^{(p)}(A) = \infty\} = \inf\{p>0 : \mathcal{L}^{(p)}(A) = 0\}$$

1923 H. moment problem $\int_0^1 x^n \, d\chi(x) = \mu_n$, $n = 0, 1, \ldots$

$\nabla^n \mu_m \geq 0$

$\int_0^1 x^{t_n} \, d\chi(x) = \mu_n$

$t_0 = 0$, $t_n > 0$, $\sum \frac{1}{t_n} = \infty$

Müntz (1884–1936) ~1914

$$\nabla^n = (I - E)^n = \sum_{k=0}^{n} (-1)^k \binom{n}{k} E^k$$

$$\begin{bmatrix} 1 & 0 & 0 & \cdots \\ 1 & -1 & 0 & \cdots \\ 1 & -2 & 1 & 0 \\ 1 & -3 & 3 & -1 & 0 \\ & & \cdots & \end{bmatrix}$$

1921 H. matrix $\lambda = \rho^{-1} \mu \rho$

$\mu = \operatorname{diag}(\mu_0, \mu_1, \ldots)$

$\rho = \rho^{-1} = [\rho_{p,m}]$

$$\rho_{p,m} = \begin{cases} \binom{p}{m} (-1)^m & 0 \leq m \leq p \\ 0 & m > p \end{cases}$$

λ Conv pres $\Leftrightarrow$ μ moment-sep. ref. $\Leftarrow$

" + $\chi([0,1]) = 1$, $\chi(\{0\}) = 0$

Knopp-Schnee thm. 1907 1909

C_α: $\mu_n = \frac{1}{\binom{n+\alpha}{n}}$, $\alpha > 0$; H_α: $\mu_n = \frac{1}{(n+1)^\alpha}$ $\alpha > 0$ $\quad C_\alpha \sim H_\alpha$

1923 Toep.-Hi. thm. $W(C) = \{ \langle Cz, z \rangle : z \in \mathbb{C}^n, \|z\| = 1 \} \subset \mathbb{C}$ convex