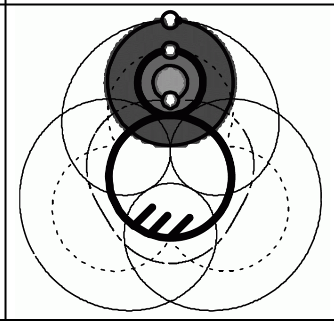
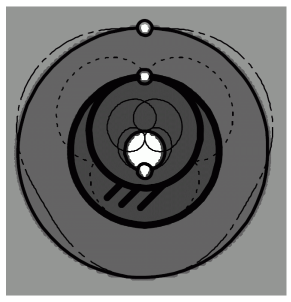
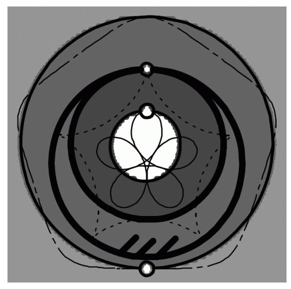
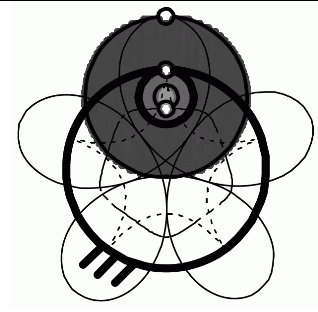
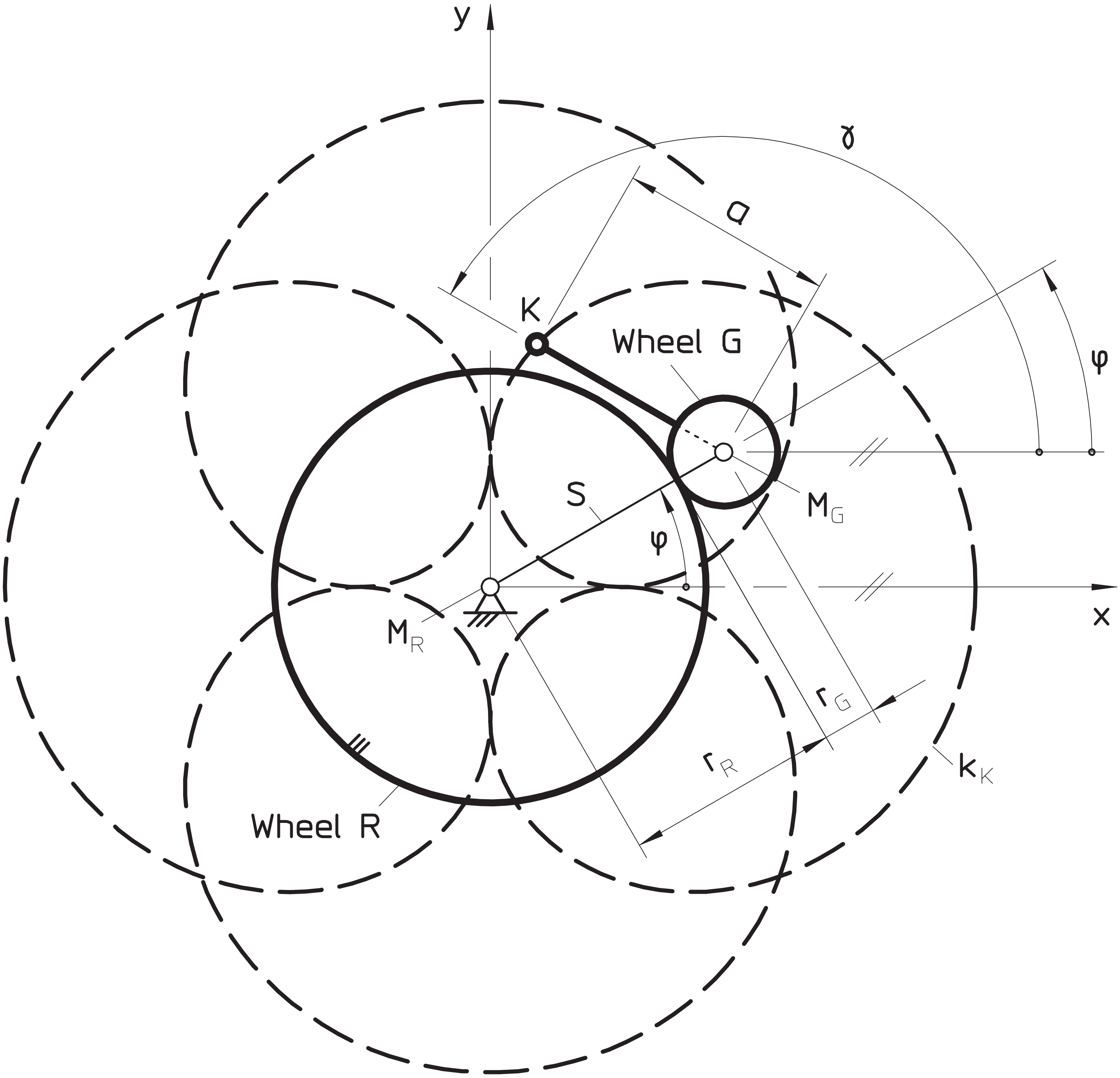
Tabelle 4.1: Trochoiden

Designation	Cross Refernce	Epitrochoid	Peritrochoid	Hypotrochoid	
Schematic representation[1)] [1)] with optical deformation	Pictures 4.16 to 4.19				
Classification				$\lvert r_R / r_G \rvert \le 2$	$\lvert r_R / r_G \rvert \ge 2$
$\mathrm{sign}(r_R) = \mathrm{sign}(i_Z)$	[24]	+1		-1	
$\mathrm{sign}(r_G) = \mathrm{sign}(i_N)$	[24]	+1	-1	+1	
$i = r_R / r_G = i_Z / i_N$	[24]	0 ... +∞	-∞ ... -1	-∞ ... -2	-2 ... -1
$m = i + 1$	[24]	+1 ... +∞	-∞ ... 0	-∞ ... -1	-1 ... 0
Coordinates oft he trochoid	([24])	$x = r_G \cdot m \cdot \cos(\varphi) + \lvert a \rvert \cdot \cos(m \cdot \varphi + \gamma_0)$ $y = r_G \cdot m \cdot \sin(\varphi) + \lvert a \rvert \cdot \sin(m \cdot \varphi + \gamma_0)$			
Angle γ_0 of the circle G in the initial position	Gl. 4.70	$\gamma_0 = -\mathrm{sign}(i_N) \cdot i \cdot \pi \cdot \left(\frac{1}{2} - \frac{n_i}{i_Z}\right)$			
Quantity $\max(n_i)$ and Numbers n_i of the Transition Curves[2)]	Gl. 4.65 Gl. 4.78	$\max(n_i) = \mathrm{int}\left(\frac{i_Z}{2}\right);\ 0 < n_i \le \mathrm{int}\left(\frac{i_Z}{2}\right)$		$\max(n_i) = \mathrm{int}\left(\left\lvert\frac{2 \cdot i_N + i_Z}{2}\right\rvert\right);\ 0 < n_i \le \mathrm{int}\left(\left\lvert\frac{2 \cdot i_N + i_Z}{2}\right\rvert\right)$	
Approximation equation for the angle $\varphi_ü$ to generate a trochoid with Selftangent Point	Gl. 4.33	$\varphi_ü = \varphi_{i+1} = \varphi_i - \frac{m \cdot \tan(m \cdot \varphi_i + \gamma_0) - \tan(\varphi_i)}{m^2 \cdot \left[1 + \tan^2(m \cdot \varphi_i + \gamma_0)\right] - 1 - \tan^2(\varphi_i)}$			
Starting angle φ_1 for the approximation equation	Gl. 4.48 Gl. 4.66 Gl. 4.69 Gl. 4.73 Gl. 4.75 Gl. 4.76 Gl. 4.77	$\varphi_1 = \varphi_{min} + \frac{\varphi_{max} - \varphi_{min}}{4}$ $\varphi_{min} = \frac{\pi}{m} \cdot \left(\frac{i}{2} - \frac{n_i}{i_N}\right)$ $\varphi_{max} = -\frac{n_i \cdot \pi}{i_Z} + \frac{\pi}{2}$	$\varphi_1 = \frac{\pi}{2 \cdot i_Z \cdot n_i}$	$\varphi_1 = \frac{\pi}{4}$	$\varphi_1 = \varphi_{max} - \frac{\varphi_{max} - \varphi_{min}}{4}$ $\varphi_{min} = -\frac{n_i \cdot \pi}{i_Z} + \frac{\pi}{2}$ $\varphi_{max} = \frac{\pi}{m} \cdot \left(\frac{i}{2} - \frac{n_i}{i_N}\right)$
Radius $r_ü$ of the Transition Curve[2)]	Gl. 4.35 Gl. 4.37	$r_ü = -(r_R + r_G) \cdot \frac{\cos(\varphi_ü)}{\cos(m \cdot \varphi_ü + \gamma_0)}$ $r_ü = r_G \cdot \frac{\sin(\varphi_ü)}{\sin(m \cdot \varphi_ü + \gamma_0)}$			
Limits for the radius $r_ü$	Gl. 4.94 Gl. 4.95	$\lvert r_G \rvert \le r_ü \le \lvert r_G + r_R \rvert$	$\lvert r_G + r_R \rvert \le r_ü \le \lvert r_G \rvert$	$\lvert r_G \rvert \le r_ü \le \lvert r_G + r_R \rvert$	
Radius of the BALL Curve[4)]	Gl. 4.86	$r_b = \left\lvert \frac{r_G}{m} \right\rvert$			
Generation of curtate trochoids, • Minimal quantity of Self-Intersection Points • Circumstance of BALL Curve[4)]	Chapter 4.1	inside of the Moving Centrode[3)]	outside of the Moving Centrode[3)]	inside of the Moving Centrode[3)]	
Generation of prolate trochoids, • Maximal quantity of Self-Intersection Points • Circumstance of BALL Curve[4)]	Chapter 4.1 u. 4.5	outside of the Moving Centrode[3)]	inside of the Moving Centrode[3)]	outside of the Moving Centrode[3)]	
Substitution to generate same trochoid	[20]	Peritrochoid	Epitrochoid	Hypotrochoid $\lvert r_R / r_G \rvert \ge 2$	Hypotrochoid $\lvert r_R / r_G \rvert \le 2$
Ratio oft the substitution gear	Gl. 4.92 Gl. 4.93	$i_Z' = i_Z$ $i_N' = -(i_Z + i_N)$			
Minimal quantity n_{S0} of Self-Intersection Points	Gl. 4.96 Gl. 4.97	$n_{S0} = (\lvert i_N \rvert - 1) \cdot \lvert i_Z \rvert$	$n_{S0} = (\lvert i_N + i_Z \rvert - 1) \cdot \lvert i_Z \rvert$	$n_{S0} = (\lvert i_N \rvert - 1) \cdot \lvert i_Z \rvert$	
Quantity n_S Self-Intersection Points between Moving Centrode[3)] and Transition Curve[2)]	Gl. 4.98	$n_S = n_{S0} + \lvert i_Z \rvert$			
Quantity n_S Self-Intersection Points between 2 Transition Circles n_i und n_{i+1}	Gl. 4.99	$n_S = n_{S0} + [\,1 + 2 \min(n_i, n_{i+1})\,] \cdot \lvert i_Z \rvert$			
Maximale Quantity n_{Smax} of Self-Intersection Points	Gl. 4.98 Gl. 4.100 Gl. 4.101	If Transition Curves[2)] are missing: $n_{Smax} = n_{S0} + \lvert i_Z \rvert$ If numerator i_Z oft the ratio i is even: $n_{Smax} = n_{S0} + 2 \max(n_i) \cdot \lvert i_Z \rvert$ If numerator i_Z oft the ratio i is odd: $n_{Smax} = n_{S0} + [\,1 + 2 \cdot \max(n_i)\,] \cdot \lvert i_Z \rvert$			
Quantity n_b of inflection point	Chapter 4.5	For the area between Moving Centrode[3)] and BALL Curve[4)] is: $n_b = 2 \cdot \lvert i_Z \rvert$ This equation is valid for all other areas: $n_b = 0$			
Quantity n_T of Selftangent Points	Volker Jäkel 2016	This equation is valid for Transition Curve[2)] $n_i = \max(n_i)$ gilt $n_T = \lvert i_Z \rvert / 2$ This equation is valid for other Transition Curves[2)] $n_T = \lvert i_Z \rvert$			
j–fold Self-Intersection Point	Volker Jäkel 2016	$a = r_G + r_R$			
i_Z is odd		$j = \mathrm{int}(i_Z / 2) \cdot i_Z$			
i_Z is even		$\lvert i_Z \rvert > 2 \quad \rightarrow \quad j = i_Z^2 / 2 - \lvert i_Z \rvert$			

2) The Transition Curve of trochoids is always a circle. All points of a Transition Curve generates a trochoid with Selftangent Point.
3) The Moving Centrode of trochoids is always a circle. All points of a Moving Centrode generates a trochoid with cusps (sharp corners).
4) The BALL Curve of trochoids is always a circle. All points of a BALL Curve generates a trochoid with approximate straight-line pattern.



Legend: R: Sun wheel/center gear (fixed)
G: Planet wheel (moving)
S: Movable arm or carrier (moving)
K: Point of wheel G creating trochoid k_K

Picture for table 4.1: **Gear to generate the trochoid k_K**